

1. Energetic cocrystals for treatment of a subterranean formation

By Schultheiss, Nathan Carl; Holtsclaw, Jeremy

From [PCT Int. Appl. \(2015\)](#), [WO 2015030730 A1 20150305](#), Language: English, Database: CAPLUS

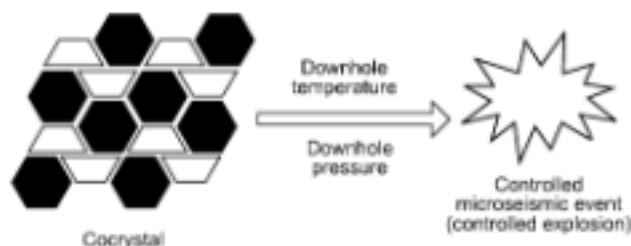


Fig. 2

The present invention relates to energetic cocrystals, and to methods for using the same for treatment of a subterranean formation. In various embodiments, the present invention provides a method of treating a subterranean formation, the method including obtaining or providing a compn. including energetic cocrystals. Each energetic cocrystal independently includes an energetic compd. and a secondary material. The method also includes placing the compn. in a subterranean formation.

~0 Citings

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2. Fundamentals on new capillaries inspired by photonic crystal fibers as optofluidic separation systems in CE

By Calcerrada, Matias; Fernandez de la Ossa, M. Angeles; Roy, Philippe; Gonzalez-Herraez, Miguel; Garcia-Ruiz, Carmen

From [Electrophoresis \(2015\)](#), [36\(3\)](#), 433-440. Language: English, Database: CAPLUS, DOI:10.1002/elps.201400239

Two prototypes of microstructured capillaries (MSCs) were designed, manufd., and used to carry out different expts. MSC-1 consisted of six holes of $\approx 28 \mu\text{m}$ id whereas MSC-2 consisted of 85 holes of $\approx 7.7 \mu\text{m}$ id. A fundamental study on the hydrodynamic injection through a com. capillary electrophoresis (CE) equipment was conducted. Exptl. times to flush sp. vol.s were approx. three times larger than the theor. values. Then, the detection of starch was carried out by using the MSCs and conventional capillaries, and the electropherograms were compared on the basis of anal. parameters employed in CE. An improvement in peak asymmetry was obtained for the MSC-1 compared to the conventional capillaries. S/N was one order of magnitude increased with the MSC, improving ten times the sensitivity. Considering this advantage, the sepn. and detection of [nitrostararch](#) was performed as a first application of the MSC-1. Minimal sample amts. of [nitrostararch](#) ($1.7 \mu\text{g}$) were detected. Results present a real interest in forensics since this substance had not been previously detected through CE, leading to new investigations in the design of new capillaries capable of enhancing CE performance.

~3 Citings

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3. Quasi-liquid fuel for internal combustion engine, and conveying and jetting method of the fuel

By Qin, Caidong

From [Faming Zhuanli Shenqing \(2010\)](#), [CN 101747962 A 20100623](#), Language: Chinese, Database: CAPLUS

The title quasi-liq. fuel is the suspension or semi-liq. or emulsified liq. manufd. from high-energy combustible materials and fuel oil through mixing in static state or dynamic state. The high-energy combustible materials are solid microparticles, solid nanoparticles, semisolid, colloid, or fluid of high-energy combustible materials, such as lignin, nitrolignin, nitrocellulose, hemicellulose nitrate, nitrated product of biomass, and coal powder with ash and impurities removed. The fuel oil is gasoline, diesel oil, etc. The quasi-liq. fuel is used for internal combustion engines.

~0 Citings

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4. Laser-imageable coating based on exothermic decomposition

By Kasperchik, Vladek; Gore, Makarand P.; Khavarj, Mehrgan

From [U.S. Pat. Appl. Publ. \(2007\)](#), [US 20070065623 A1 20070322](#), Language: English, Database: CAPLUS

An optical recording medium comprises a substrate, an imaging layer comprising a compd. that decomp. exothermically when heated to a predetd. temp., and, optionally, a color layer.

~1 Citing

5. Optimization of conditions of nitrohydrocarbon determination in air

By Korenman, Yakov I.; Niftaliev, Sabukhi I.; Kalach, Andrei V.; Mikhalev, Aleksei P.
From [Hemijska Industrija \(2000\)](#), 54(7-8), 324-326. Language: English, Database: CAPLUS

Piezoquartz micro-weighing was used to study the properties of piezo-sensors modified with nitrocellulose, **nitrostarch**, Triton X-100, Carbowax 20M, and triethanolamine; aliph. and arom. nitrohydrocarbons were used as adsorbates. Piezo-sensor selectivity relative to adsorbates was studied. Change of piezo-sensor electrode output anal. signals was examd. as a function of the nature of the modifiers, gas flow rate, and detection temp. The most sensitive surface modified relative to nitrohydrocarbons were chosen for piezo-sensors.

~1 Citings

6. Method for destroying energetic materials

By Abel, Albert E.; Mouk, Robert W.; Getman, Gerry D.; Hunter, Wood E.
From [PCT Int. Appl. \(1998\)](#), [WO 9828045 A2 19980702](#), Language: English, Database: CAPLUS

Energetic materials, such as nitrocellulose, TNT, RDX, and combinations thereof, optionally in combination with chem. warfare agents, such as mustard gas, Lewisite, Tabun, Sarin, Soman, VX, and combinations thereof, are destroyed when chem. reacted according to the method of the invention. The method comprises reacting the energetic materials and chem. warfare agents, if present, with solvated electrons which are preferably produced by dissolving an active metal such as sodium in a nitrogenous base such as anhyd. liq. ammonia.

~10 Citings

7. Method for safely disposing of propellant and explosive materials by conversion into fertilizers

By Heaton, Harley L.; Walia, Daman S.; Stashick, Joseph J.
From [PCT Int. Appl. \(1996\)](#), [WO 9637265 A2 19961128](#), Language: English, Database: CAPLUS

A one step process is provided which denitrifies explosives and propellants and reclaims the evolved nitrogen therefrom, while concurrently modifying the remaining carbonaceous materials into humic acid suitable for plant fertilizer applications. Explosives and propellants are hydrolyzed with a soln. of Actosol humic acid ext. The humic acid ext. fixes the free nitrogen evolved, preventing its loss as ammonia or NO_x gases. The Actosol-fixed nitrogen is then available directly to plants as slow-release nitrogen, and can directly replace nitrogen derived from urea or other sources in plant fertilizers. The carbonaceous material remaining from the denitrification process is non-explosive and is taken up in the humic acid matrix. This material is immediately available to plants as a carbon source. The humic acid matrix chelates any metal ions released from the explosive or propellant as a consequence of the denitrification process, and makes these metal ions available to plants as micronutrients.

~0 Citings

8. Shaped explosive by recrystallization from a non-aqueous self-explosive emulsion

By Shepherd, Walter B., Jr.
From [U.S. \(1996\)](#), [US 5552000 A 19960903](#), Language: English, Database: CAPLUS

An explosive compn. is derived from a non-aq. emulsion of a soln. of a self-explosive dispersed as the discontinuous phase throughout a continuous phase which is substantially immiscible with the discontinuous phase. The emulsion is prep'd. by adding a soln. of self-explosive into a dispersion of surfactant or emulsifier in fuel at a temp. high enough to prevent pptn. of the self-explosive from soln., cooling and aging the emulsion to form a pourable or pumpable, and destabilization and recrystn. in a cavity to form a shaped mass of crystals of self-explosive. The shaped explosives have high energy and d.

~4 Citings

9. Phlegmatized explosive composition

By Egeli, Oyvind

From [Eur. Pat. Appl. \(1995\), EP 661251 A1 19950705](#), Language: English, Database: CAPLUS

Explosives in semi-plastic, paste or slurry form comprise ≥ 1 high explosive in mol. form, ≥ 1 one pulverizing agent, a phlegmatizing agent, and solid particles of a material which is softer or deformable than the particles of the pulverizing agent. The explosives have high safety without sacrificing the sensitivity.

~3 Citings

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10. Coating of primary and/or secondary explosives with fire-resistant, antistatic and/or lubricating inert materials

By Pabst, Winfried

From [Ger. \(1992\), DE 4117718 C1 19920702](#), Language: German, Database: CAPLUS

The process comprise mixing the explosives with a nonionic surfactant that is liq. at room temp., and mixing the mixt. with the inert material. This method is esp. suitable for coating security-type explosives that have short detonation flames and do not ignite CH₄- and coal-air mixts. in coal mines. Preferably, the surfactant is selected from ethoxylated compds., e.g., nonylphenol, sorbitan monostearate, -oleate, -palmitate, and -laurate, having hydroxyl no. 65-113 and sapon. no. 40-55. The inert material is selected from ≥ 1 of alk. earth stearates, carbonates, acetates, and chloride, and cryolite, graphite, carbon black, and talc. Thus, 3 kg Tetryl was mixed with 12 mL ethoxylated sorbitan monolaurate (hydroxyl no. 40) for 40 min, and then with 158 g cryolite and 1.8 g Astradiamond green (color-coding for distinguishing from normal Tetryl) for 60 min.

~3 Citings

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11. Scale inhibitors for reactors for manufacture of vinyl polymers

By Shimizu, Toshihide; Sato, Takanori

From [Jpn. Kokai Tokkyo Koho \(1992\), JP 04050201 A 19920219](#), Language: Japanese, Database: CAPLUS

The title inhibitors comprise proteins and polysaccharides. Thus, in suspension of vinyl chloride in a reactor coated by a 0.5% soln. of 1:1 gelatin-dextrin mixt. in 90:10 H₂O-MeOH, 11 g/m² scale was deposited in the reactor, vs. 1300 for reactors without the coatings.

~0 Citings

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12. Emulsion explosive containing nitrostarch

By Mullan, John J.; Sohara, Joseph A.; Schulz, Dennis J.

From [U.S. \(1991\), US 5051142 A 19910924](#), Language: English, Database: CAPLUS

Nitrostarch 5-50% is added to an emulsion explosive compn. comprising a discontinuous aq. oxidizer salt phase and a continuous carbonaceous fuel phase. The emulsion explosive prepd. exhibits increased resistance to precompression or dead pressing while maintaining high detonation velocity.

~1 Citing

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13. Performance-oriented packaging standards; changes to classification, hazard communication, packaging and handling requirements based on UN standards and agency initiative

No Author and Editor data available

From [Federal Register \(1990\), 55\(246\), 52402-729](#). Language: English, Database: CAPLUS

The hazardous materials regulations under the Federal Hazardous Materials Transportation Act are revised based on the United Nations recommendations on the transport of dangerous goods. The regulations cover the classification of materials, packaging requirements, and package marking, labeling, and shipping documentation, as well as transportation modes and handling, and incident reporting. Performance-oriented stds. are adopted for packaging for bulk and nonbulk transportation, and SI units of measurement generally replace US customary units. Hazardous material descriptions and proper shipping names are tabulated together with hazard class, identification nos., packing group, label required, special provisions, packaging authorizations, quantity limitations, and vessel stowage requirements.

~0 Citings

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14. Aqueous explosive slurries with inorganic peroxide sensitizer

By Griffith, George L.

From [U.S. \(1978\)](#), [US 4081299 A 19780328](#), Language: English, Database: CAPLUS

The title explosives are sensitized by H_2O_2 . Thus, a slurry contg. **nitrostarch** [9056-38-6] 21.6, NH_4NO_3 29.5, $NaNO_3$ 10, $Ca(NO_3)_2$ 4.76, $Mg(NO_3)_2$ 4.29, ZnO 0.8, corn sugar 6, hollow glass microspheres 1, $K_2S_2O_8$ 0.4, Al 5, guar gums 1.15, Zn chromate 0.1, and water 15.37% was detonated by an A-1 blasting cap. An identical slurry, but with no H_2O_2 and 15.4% water, required an A-4 cap.

~4 Citings

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15. Aqueous slurry explosives with colloidal hydrous metal oxide

By Barnhard, Phillip, IV; Kieres, Francis John

From [U.S. \(1977\)](#), [US 4058420 A 19771115](#), Language: English, Database: CAPLUS

Nitrate-based slurry explosives are thickened with colloidal hydrous metal oxides which allow the slurries to be mixed or packaged before there is any thickening and slurry desensitization. Thus, a slurry contg. NH_4NO_3 43.2, $NaNO_3$ 10, coal 1, corn sugar 6, **nitrostarch** [9056-38-6] 20, Al 4, colloidal Al_2O_3 0.8, and water 15 wt.% was thickened, cast into casings, and detonated with conventional blasting caps.

~6 Citings

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16. High-energy flexible explosive: III. The nitric ester-plasticized **nitrostarch** binder system

By Wells, Franklin B.

From [Tech. Rep. ARLCD-TR \(U. S. Army Armament Res. Dev. Command\) \(1977\)](#), ([ARLCD-TR-77043](#)), 53 pp..

Language: English, Database: CAPLUS

A flexible explosive of high power and brisance which is resistant to friction and impact [and to water when plasticized with TMETN (trimethylolethane trinitrate) [3032-55-1]] and which remains flexible at $\geq 40^\circ$ when plasticized with TEGDN (triethylene glycol dinitrate) [111-22-8] is provided by compns. contg. a fine-grained high explosive, e.g., HMX [2691-41-0], RDX, PETN, or mixts. thereof ~76, **nitrostarch** (I) [9056-38-6] (~12.9-13.1% N) 10-14, TMETN or TEGDN in amts. providing a I/plasticizer ratio 0.6-1.8:1, and Ph_2NH [122-39-4] stabilizer 0-5% (based on I). Thus, a compn. contg. HMX 68, I 14, TMETN 18, Ph_2NH 0.7%, and EtOAc ~70 mL/100 g of mix was rolled into EtOAc-free sheets 6.2 mm thick which were elastic, smooth, and tough having detonation velocity 8219 m/s, d. 1. 59 g/cm³, ballistic pendulum value (TNT = 1.0) 1.316, bullet impact no fire or explosion, friction pendulum (steel shoe) no crackle, fire, or explosion; cap sensitivity no. 8 cap, and cold temp. 10° .

~0 Citings

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17. Flexible explosive composition comprising particulate RDX, HMX or PETN and a **nitrostarch** binder plasticized with TEGDN or TMETN

By Wells, Franklin B.

From [U.S. \(1977\)](#), [US 4014719 A 19770329](#), Language: English, Database: CAPLUS

Trimethylolethane trinitrate (TMETN) [3032-55-1] or triethyleneglycol dinitrate [111-22-8] plasticizers in **nitrostarch** [9056-38-6]-bonded explosives give high-explosive cap-sensitive compns. which are resistant to impact and shock and which remain flexible, in sheet form, at $\leq -40^{\circ}\text{F}$. Nitramines and PETN [78-11-5] 60-80 are used with the binder-plasticizer system 20-40 wt.%. The binder:plasticizer ratio is ~ 0.7 -1.4:1 and the **nitrostarch** contains 12.9-13.1% N. Thus, a formulation consisting of HMX [2691-41-0] 340, **nitrostarch** 70, diphenylamine 3.5, TMETN 90 g, and EtOAc 75 mL gave smooth, tough, elastic sheets resistant to bending at -10° and sensitive to a 2 kg hammer dropped 15 in.

~3 Citings

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18. Thermally stable **nitrostarch**

By Stack, Joseph S.

From [U.S. \(1975\)](#), [US 3883378 A 19750513](#), Language: English, Database: CAPLUS

Nitrostarch [9056-38-6] (12.55% N) was treated in acetone with 4.8 wt.% 2,4-tolylene diisocyanate [584-84-9] and the resulting lacquer poured into water to give heat-stable material for use as a substitute for nitrocellulose (I) as a propellant binder. Stability was detd. by the methyl violet paper test at 134.5° . Time to a salmon-pink color was 45 min (I, 30-5 min); to red fumes 80 min (I 35 min); and to deflagration >500 min (I >300 min) compared with 15 min for unstabilized **nitrostarch**.

~0 Citings

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19. Source-identifiable explosive

By Griffith, George L.; Edwards, Donald W.

From [U.S. \(1974\)](#), [US 3835782 A 19740917](#), Language: English, Database: CAPLUS

The source or manufacturer of an explosive or an explosive item can be identified by addn. to the explosive compn. or deposition on the case, or even the label, of 0.025-2% of 40-2000 μ particles of nonthermally luminescent materials that are decompn.-resistant during explosion. The luminescent material emits electromagnetic radiation, charged particles, etc. on excitation, producing UV, visible, and/or ir light and providing a spectrum useful for identification. Suitable luminescent materials include franklinite, Zn ore, and willemite. Thus, 2% Fe-free <40 -mesh franklinite was mixed with a 40% **nitrostarch**-based ammonium dynamite (40WR and a 1.25 \times 8-in. stick of it detonated in a 55-gal steel drum. Under UV excitation, particles of the ore are readily detectable by their light-green color on fragments of the drum. Various phosphors and phosphorescent pigments were mixed with 40WR and examd. after detonation with 1500-2600 and 3600-700 \AA light. Coating with a polyurethane resin improved results. Willemite was easily detectable, but limestone was not. Nitrates of Sm and Dy could not be identified.

~5 Citings

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20. Explosive composition

By Clark, Willard Frederick

From [S. African \(1973\)](#), [ZA 7206488 A 19730627](#), Language: English, Database: CAPLUS

Cast explosive compns. that may be used as boosters and high-d. blasting agents are prepd. without need for a high temp., and detonated with a relatively small high-pressure booster. They are obtained by use of mixts. contg. 30-93% an inorg. oxidizer; 5-40% thiourea; 2-20% H_2O ; 0-30% sensitizers and/or fuels, such as **nitrostarch**, TNT, or powd. metals, (particle size not crit.), coal dust, S, oils, sugars, or urea; 0-5% of a control agent in the form of microballoons or a blowing agent; and 0-5% thickener or gelling agent. The slurry thus formed becomes a stiff, very hard material. Thus, a series of compns. contg. NH_4NO_3 46.2, NaNO_3 15.4, thiourea 15.4, H_2O 7.7, flake Al 15.4%, and guar gum and various proportions of microballoons were prepd. Hardened specimens (31.7 g each) initiated with an HDP-3 wafer booster produced the following Pb-block deformations: at 70°F , 0.45, 2.34, 2.34, and 2.14 cm at ds. of 1.43, 1.24, 1.12, and 0.91 g/cm^3 , resp.; and, at 30°F , 0.10, 0.36, 1.37, and 1.83 cm at ds. of 1.41, 1.27, 1.13, and 0.87 g/cm^3 , resp.

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21. Explosive nitric ester gels

By Gay, Gordon M.

From [U.S. \(1973\), US 3736196 A 19730529](#), Language: English, Database: CAPLUS

A uniform nitrocellulose (NC)/nitroglycerin (NG) gel is prepd. by dispersing 0.05-8% NC (any grade including guncotton and **nitrostarch**) 5-15% ethylene glycol and (or) glycerol mixt. (contg. $\leq 50\%$ H₂O) and stirring in 80-90% NG (preferably a nitrated 35/65 ethylene glycol/glycerol mixt.). Thus, 0.2 lb nitrocotton was mixed for 1 min with 1 lb ethylene glycol and this mixt. and 14 lb NG was mixed for 5 min to form a uniform, relatively thick gel. A dope mix contg. starch 2.5, fine S 1, <20-mesh coal 2, 20-mesh coal 2, fine NH₄NO₃ 54, fine NaNO₃ 11.8, T-14 pulp 0.5, and chalk 1 lb was prepd.; 1/3 of it was mixed for 1 min with the gel, 10 lb H₂O stirred in at 135°F followed by the rest of the dope mix and 2 lb crosslinked guar gum, stirring was continued 6 min to produce an aq. explosive slurry of unconfined sensitivity (1.25 × 16 in.) detonated by a 0.25 lb booster, unconfined detonation rate 15,000-16,000 ft/sec, confined detonation rate 18,000-19,000 ft/sec, and d. 1.56 g/cm³.

~1 Citing

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22. Explosive composition containing a glycol and guar gum ether

By Falconer, Errol Linton; Finch, Gerhard F. O. K.

From [U.S. \(1973\), US 3730790 A 19730501](#), Language: English, Database: CAPLUS

Gelatinous and semigelatinous explosives that are essentially hysteresis-free, and yet are free of liq. nitric esters, consist of mixts. of $\leq 15\%$ of ≥ 1 high-energy sensitizer, such as TNT, PETN, RDX, an amine nitrate, a propellant, or **nitrostarch**; $\leq 75\%$ of an oxidizer, such as an NH₄ or alkali or alk. earth nitrate or perchlorate; $\leq 47\%$ C2-3 glycol or glycol polymer; and 0.2-10% thickener, such as a hydroxypropyl ether of glucose, mannose, or galactose polysaccharides or their mixts. Thus, a mixt. of MeNH₂.HNO₃ 8, NH₄NO₃ 56.2, NaNO₃ 12, Co(NO₃)₂.6H₂O 2, S 2 wt. %, 20.3% of a soln. contg. ethylene glycol 11.6, diethylene glycol 3.6, HCONH₂ 7.1, tech. Ca(NO₃)₂ 19, MeNH₂.HNO₃ 42.5, NH₄NO₃ 14.2, surfactant 1.0, and hydroxypropyl guar (I) 1 wt. %, and addnl. I 0.5% gave a gelatinous blasting agent of d. 1.24 g/cm³ and detonation sensitivity in 1.75-in. cartridges 10 g pentolite.

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23. Explosive composition for bonding containing and organo metallic polymer

By Velten, Robert H.

From [U.S. \(1973\), US 3730791 A 19730501](#), Language: English, Database: CAPLUS

Secondary explosives having detonation rates of 6500-12,500 ft/sec and useful as explosive compns. for metal bonding consist of mixts. of a high explosive, such as pentolite or **nitrostarch**, and conventional metallic fuels and (or) conventional oxidizer salts bonded or suspended in a polymer formed from heavy metal oxides, preferably of Pb, and C3-10 diols, triols, and tetrols in amts. of 60% up to the stoichiometric proportion in the mixt. Thus, a mixt. of **nitrostarch** 54, NH₄NO₃ 6, Al powder 1, gum arabic 7, and a PbO-glycerol reaction mixt. 17% in the form of a slurry was used as a 0.25-in. layer to bond a stack of 300 6 × 36-in. × 1-mil sheets of PH 15-7 Mo stainless steel having printed spaced transverse strips of poly(vinyl acetate)-base adhesive (U.S. 3,449,819), which allowed the explosively bonded stack to be expanded to form a hexagonal honeycomb structure. The detonation rate of the slurry used was 12,500 ft/sec. A 6061 Al-alloy sheet and a 75A Ti-alloy sheet were bonded to the top of the stack and a steel layer 1-in. thick was bonded to the bottom of the stack with a rubber-base adhesive. The assembly was explosively bonded by an arrangement that is described.

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24. Explosive slurry having constant detonation velocity over a wide temperature range

By Schwoyer, William L.

From [U.S. \(1972\), US 3676234 A 19720711](#), Language: English, Database: CAPLUS

An aq. explosive slurry is described that has a const. detonation rate over a wide temp. range and is sensitive enough to be detonated as a film or layer 0.25-0.5 in. thick. The slurry is based on a primary high explosive, such as pentolite, **nitrostarch**, or PETN; an inorg. oxidizer; an amide that forms a eutectic mixt. with inorganic nitrates, and an H₂O-sol. thickener to adjust the viscosity of the slurry. The detonation is initiated by a no. 10 blasting cap and has a const. velocity of 15,000-20,000 ft/sec. An inorg. coolant salt that is insol. in H₂O and has a high sp. heat reduces the velocity to the stated range.

~1 Citing

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25. Detonating charge for initiation with mild detonating cord

No Inventor data available

From [Fr. \(1969\)](#), [FR 1584062 19691212](#), Language: French, Database: CAPLUS

A heavily encased boosting device for instantaneous or delayed initiation of detonation at the bottom of deep holes of relatively insensitive blasting agents, such as those of the NH₄NO₃-fuel oil type, consists of 2 parts which are united just prior to use, viz., a boosting charge and a firing train activated by mild detonating cord. In practice, mild detonating cord activates, through a metal barrier, an initiating charge comprising a mixt. of KClO₃ and PETN, nitromannite, or **nitrostarch**, which in turn ignites a thermite-type delay column (if desired) comprising Pb₃O₄-Si, Pb₃O₄-B, or KMnO₄-Sb. This, or the initiating charge, fires a ZrO₂-Pb₃O₄ charge which initiates a fulminating charge of Pb₃O₄-Si-KClO₃-nitrocellulose or black powder and this then initiates detonation of the boosting charge, consisting of RDX, PETN, or other solid nitric esters or plastic mixts. based on nitrocellulose and nitroglycerin or nitroglycol.

~0 Citings

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26. Fuse cord with lowered brisance

By Prior, Josef; Prashik, Gottfried

From [Brit. \(1969\)](#), [GB 1165506 19691001](#), Language: English, Database: CAPLUS

Fuse-filling compns. are described wherein the high brisance of explosives such as RDX, PETN, HMX, nitromannite, and **nitrostarch** is reduced by inclusion of 5-95% of an explodable nitric acid salt of an ammonia deriv. without objectionable increase in the crit. diam. These salts include nitrates of ammonia, urea, thiourea, lower amines and diamines, guanidine, etc. The fuse compns. are made free flowing by including granulating agents, such as nitrocelluloses, Me celluloses, and Et celluloses. For example, a fuse cord was made by charging into a 2.2 mm. diam. flexible staple rayon tube a compn. of 20 parts PETN (grain size 0.1 mm.) and 80 parts NH₄NO₃ (grain size 0.1 mm.) to a d. of 1.00. The detonation velocity was 2350-m./sec.

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27. Safe aqueous slurries of particulate nitrated explosives and polyacrylamides

By Griffith, George L.; Schwoyer, William L.

From [U.S. \(1969\)](#), [US 3457128 A 19690722](#), Language: English, Database: CAPLUS

Particulate self-explosive nitrated materials, such as **nitrostarch**, PETN, TNT, and their mixts., can be made relatively safe to handle and transport through formation of a uniform nongelled aq. slurry contg. 10-50% H₂O and 0.05-10% partially hydrolyzed polyacrylamide suspending agent having 0.1-50% free acid and ≥50% unhydrolyzed amide groups and a mol. wt. of 1,000,000-25,000,000. Such slurries are esp. useful for transporting explosive sensitizers used in aq. slurry blasting agents. Thus, a mixt. was prepd. by stirring together 66% dry **nitrostarch**, 39.8% H₂O, and 0.2% Polyhall 295 (a com. partially hydrolyzed polyacrylamide of mol. wt. 3,000,000-8,000,000 contg. 15-30% amide groups hydrolyzed to acid groups). This slurry showed no sepn. after 2 months' storage at 50-80°F., after which 50 parts of it was blended with dry NH₄NO₃ 50, flake Al 30, and H₂O 11 parts to produce an explosive blasting slurry which, when tested in a bore hole, detonated readily and produced good rock breakage.

~0 Citings

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28. Gelatinized dinitrotoluene-nitrostarch explosive sensitizers

By Griffith, George L.

From [U.S. \(1968\)](#), [US 3399089 A 19680827](#), Language: English, Database: CAPLUS

A **nitrostarch** explosive sensitizer compn. consists of DNT in a gelatinized combination with **nitrostarch** as a supplemental sensitizer. This compn. can be used as an explosive sensitizer in formulations of various kinds. When formulated as an explosive, this compn. may also contain an inorg. oxidizer, e.g. NH₄NO₃, and optional addnl. ingredients, e.g. fuels, stabilizers, and other components conventional in explosive formulations. A typical compn. consists of **nitrostarch** 22.00, DNT 4.15, NH₄NO₃ 54.20, NaNO₃ 14.80, nut meal 2.00, flake Al 2.50, Ph₂NH 0.05, and oil no. 50.30%. The d. was 1.195, detonation rate >3418 m./sec., and standard ballistic-pendulum value 11.2. Slurried as well as granular explosive mixts. can be prepd.

~0 Citings

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29. Explosive compositions containing a soluble polyflavonoid as a sensitizer

By Falconer, Errol L.; Kelly, Cornelius J. N.

From [Can. \(1968\), CA 784637 19680507](#), Language: English, Database: CAPLUS

Explosive compns. comprising essentially 30-90% inorg. O-supplying salt (nitrates of ammonia, Na, K, Ba, Ca, or mixts. thereof), 0.1-25% sol. polyflavonoid (sensitizer), 1-30% mutual solvent for the inorg. O-supplying salt and the polyflavonoid (water, or mixts. of water with HCONH₂, Me₂SO₂, lower glycols, or alcs.), 0.1-10% thickener (guar gum or carab seed), and 0-40% by wt. fuel (carbonaceous material, particulate org. explosive (TNT, RDX, PETN, Compn.B, pentolite, smokeless powder, nitrocellulose, **nitrostarch**, and mixts. thereof), particulate light metal or metalloids, S, C, urea, and mixts. thereof), the O balance of total compn. being + 15 to -35 g. O/100 g. finished explosive, have substantially increased sensitivity, are nonself-explosive, and may be readily detonated in boreholes of small diam. Thus, a slurry explosive compn., contg. 53.0% NH₄NO₃, 18.0% NaNO₃, 1.2% urea, 0.8% tamarind flour, 18.0% particulate Al, and 9.0% by wt. H₂O, when packaged in 2.5-in.-diam. cartridges and exposed to a 160-g. pentolite primer fails to detonate; whereas a similar compn. contg. 1.5% by wt. polyflavonoid (Na salt of Rayflo-C) in place of a like amt. of NH₄NO₃, is easily detonated with a similar primer at a detonation velocity of 3580 m./sec. Metallic chromates (Na, K, Zn, or Ba) may also be added to the above compns., these compds. being used as cross linking agents for polysaccharides in aq. slurries. The polyflavonoid-sensitized compns. described may be used as practical com. low-cost explosives having great handling safety.

~0 Citings

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30. Slurried explosive

By Bronstein, Jesse B., Jr.

From [U.S. \(1968\), US 3395056 A 19680730](#), Language: English, Database: CAPLUS

The title material consists basically of MeOH as fuel, NH₄NO₃ as oxidizer, and 0.1-3% alc. thickening agent, such as Me hydroxypropyl guar gum, poly(oxyethylene)glycols, and glycol ethers (Ucar resin C-149 and WSR-301). It also contains 1-10% H₂O and may contain powd. metal as addnl. fuel; other nitrates, chlorates or perchlorates as addnl. oxidizers; and any conventional sensitizing explosive, such as **nitrostarch**. The material is particularly suitable for rock blasting, where it can be mixed on the spot and pumped into the bore holes. As such, it is used in conjunction with an highly brisant primer at a rate of 1-2 lb. primer every 5-ft. rise in a 5-in.-diam. hole or every 8 ft. in a 8-in.-diam. hole. Thus, an explosive mixt. was prepd. from granulated NH₄NO₃ 84.30, MeOH 10.00, water 5.00, Ucar Resin C-149 0.65, and NH₄OH 0.05% by wt. The pH of the mixt. was 7.6. It was pumped into an 8-in.-diam. bore hole and provided with 2-lb. Compn. B primers every 8 ft. of rise. It gave complete detonation and good rock breakage.

~0 Citings

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31. The ignition of condensed substances in a heated gas

By Grigor'ev, Yu. M.; Lisitskii, V. I.; Merzhanov, A. G.

From [Fizika Goreniya i Vzryva \(1967\), 3\(4\), 512-26](#). Language: Russian, Database: CAPLUS

The ignition of nitrocellulose, poly(vinyl nitrate), Ba azide, and **nitrostarch** by a hot gas stream was studied. Air, Ar, and O-enriched air, heated to 200-600°, were used. The ignition delay was detd. directly by photoelec. measurements and ranged from 0.1 to 100 sec. The flow of hot gas was adjusted to low values of the Reynolds and Grashof nos. so that the heat transfer would be essentially by cond. For nitrocellulose, poly(vinyl nitrate), and Ba azide, the crit. explosion temp., T₀, depends upon α , the coeff. of heat transfer, and is independent of the gas compn. With nitro-starch, increasing the O content of the gas decreases T₀. The crit. parameters for thermal explosion are also treated theoretically.

~2 Citings

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32. Inorganic nitrate explosive slurries

By Griffith, George L.

From [U.S. \(1968\), US 3378415 A 19680416](#), Language: English, Database: CAPLUS

Title compns. are described which consist of an agglomerate of an inorg. nitrate oxidizer and a particulate fuel (the fuel selected from the group consisting of carbonaceous fuels, meal fuels, and mixts. of carbonaceous fuels and metal fuels being present to the extent of at least 75% of the amt. required to O-balance the mixt.) and a fluid selected from the group consisting of water, oil, and mixt. of water and oil amounting to 7-50% of the slurry. If greater sensitivity is required explosives such as TNT, DNT, PETN, Pentolite, RDX, Composition B, etc. may be included. An explosive slurry was made as follows. A blend of 86.24 of NH₄NO₃ and 7.84 parts NaNO₃ was melted in a steam-jacketed kettle and then poured into a mixing trough in which there was blended therewith 4.3 nut shell meal and 1.62 parts water. The blend was mixed and cooled slightly to a plastic consistency, whereupon it was screened through a 30-mesh screen and the granules thus formed allowed to harden. The resulting mass was composed of particles 49.25% retained on a No. 10 screen, 39.25% on a No. 18 screen, 10.25% on a No. 35 screen, 1.25% on a No. 60 screen, and none through a No. 60 screen. The granular particles were used to prep. the following compn.: explosive particles 84.6, oil No. 5 1.5, DNT 2.5, Jaguar 100 guar gum 5.0, **nitrostarch** 6.1, and Fe oxide 0.3%. Eleven kg. of the resultant dry-mixed explosive was mixed with 5.6 kg. of water and allowed to stand overnight. A 5 in. x 5 lb. pentolite booster was poured into a 5 in. x 25 lb. "I.C.C. 25G 50" cartridge, and to this was added 9725 g. of above compn. contained in an 8 mil polyethylene liner. The cartridge was detonated under 15 to 20 ft. of water with good explosive effect.

~0 Citings

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33. Stabilization of polymeric carbohydrate nitrates of starch, amylose, amylopectin and glycogen

By Mustafa, Ahmed; Dawoud, Abdel F.; El-Shorbani, Salah

From [Staerke \(1968\)](#), [20\(2\)](#), 55-9. Language: English, Database: CAPLUS, DOI:10.1002/star.19680200206

Whole starch, amylose, amylopectin, and glycogen were nitrated by mixed acids (procedure A), HNO₃ (procedure B) and HNO₃ in the presence of P₂O₅ (procedure C, used for starch only). Cold EtOH stabilization was effected by suspending crude nitrated products, as well as those that had already been stabilized by boiling in H₂O for 150 hrs., in EtOH for 8 hrs., followed by washing and refluxing with distd. H₂O under reflux for 16 hrs. Hot EtOH stabilization of the samples prepd. as above was effected by continuously extg. them with hot EtOH for 8 hrs., followed by boiling with H₂O for 16 hrs. Some of the samples obtained above were given a further treatment with boiling aq. Na₂CO₃ (0.075%). The total sulfate content of the samples prepd. by procedure A has been detd. and appreciable lowering of these values accompanied by improvement in stability has been observed in samples subjected to hot EtOH treatment. Further alk. carbonate treatment of samples which have had hot EtOH treatment resulted in further improvement of stability. It is concluded that the stabilizing action of hot EtOH and carbonate could be attributed to removal of free acidity as well as some of the nitrated oxidn. impurities, carbonate being much more effective in this respect. Glycogen nitrate behaved similarly in this respect as compared with whole starch nitrate and fractionated starch nitrates.

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34. Ammonium nitrate explosive mixtures containing aluminum

By Griffith, George L.; Lyte, George A.; Wells, Franklin B.

From [U.S. \(1968\)](#), [US 3366053 A 19680130](#), Language: English, Database: CAPLUS

Free-flowing inorg.-nitrate based explosives are sensitized to initiation by incorporation therein of 1-4% powd. Al and 1-6% H₂O. Caking takes place with >6% H₂O. The inorg. nitrate may contain 75-95% NH₄NO₃ and 5-25% alkali metal nitrate. Explosive sensitizers, such as **nitrostarch** (preferred), nitroglycerin, TNT, PETN, RDX, pentolite, and "compn. B" 5-7%; carbonaceous fuels; 0.4% stabilizers, such as CaCO₃ and up to 0.4% MgO; and ~0.4% of materials such as rosin, metallic resinates, hexamine, waxes, and mineral oil may also be present. Thus, a mixt. of NH₄NO₃ 96 and 4% Al powder required a no. 6 cap for initiation; a similar mixt. contg. 1.25% added H₂O was sensitive to a no. 11/2 cap. Another mixt. contg. NH₄NO₃ 70.68, NaNO₃ 8.91, Al powder 1.57, **nitrostarch** 12.09, CaCO₃ 0.2, wood flour 6.54, and carbon black 0.01% was a blasting compn. of d. 1.08-1.10, sensitive to a no. 10 cap. When 4.45 parts H₂O was mixed with 95.55 parts of the above compn., the product had a d. of 1.48-1.52 and was sensitive to a no. 8 cap. If, however, the H₂O was added as bound H₂O, as by addn. of 19.6 parts Na borate decahydrate, the d. became 1.16 and the product was sensitive to a no. 16 cap.

~2 Citings

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35. Aqueous ammonium nitrate explosive slurries containing partially hydrolyzed polyacrylamide

By Bergwerk, Jack E.

From [U.S. \(1967\)](#), [US 3341383 19670912](#), Language: English, Database: CAPLUS

Blasting explosives in the form of aq. slurries or pumpable gels of NH_4NO_3 are used in oil discovery and recovery operations, mining, and road building. A pourable, nonsettling, H_2O -resistant slurry of NH_4NO_3 and an explosive sensitizer (TNT, **nitrostarch**, or a propellant) can be made by mixing it with a partially hydrolyzed polyacrylamide having a degree of hydrolysis such that from 15-40% of the monomeric units have been converted to the hydrolyzed form. The product has a mol. wt. such that a 1% soln. of the polymer in distd. H_2O will have a viscosity of 1500-7000 cp. at 25° , as measured by a Brookfield viscometer at 20 rpm. with a no. 4 spindle. A further improvement is obtained by using a suspending agent comprising a mixt. of the hydrolyzed polyacrylamide with a crosslinked galactomannan gum. One example is a mixt. of 96% guar gum and 2% K pyroantimonate. These materials are combined in wt. proportions ranging from 1:3 to 3:1. This compn. provides an NH_4NO_3 slurry having a soft, moldable consistency and good H_2O resistance.

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36. Explosive slurries containing an explosive oxidizer salt and particulate fibrous naturally wet pulpy plant matter

By Griffith, George L.

From [U.S. \(1968\)](#), [US 3361604 A 19680102](#), Language: English, Database: CAPLUS

Explosive slurries contg. particulate vegetable and (or) fruit pulp as a major portion of the fuel are provided. Such slurries comprise mixts. of 50-70% of an inorg. oxidizer such as nitrates, perchlorates, or chlorates of NH_3 and alkali metals or alk. earth metals, 0-40% (preferably 25-30%) sensitizing explosive, such as **nitrostarch** (preferred), TNT, PETN, nitrocellulose, pentolite, or compn. B, 0.1-30% of a finely divided pulpy vegetable matter, including waste material, derived from substantially any fruit or vegetable in either the fresh or a fermented or otherwise decompd. condition, and 7-50% suspending medium, such as H_2O or oil, including juices present in the pulpy vegetable matter. Metallic and carbonaceous fuels, thickeners, antacids, etc., may also be present. Thus, a mixt. contg. dry **nitrostarch** 20, NH_4NO_3 44.6, orange pulp 25, guar gum 0.4, paraffin oil (100 Saybolt Universal sec. viscosity) 5, and H_2O 5% provides a good explosive slurry, d. 1.35, ballistic pendulum value 10.00, viscosity 300 cp., sensitivity to initiation (in a 1.5-in. pipe) 50 g. pentolite, rate of detonation >3600 m./sec.

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37. Inorganic oxidizer salt explosive compositions containing paper sheet particles as pouring-density reducers

By Griffith, George L.

From [U.S. \(1968\)](#), [US 3361603 A 19680102](#), Language: English, Database: CAPLUS

Explosive compns. of unusually low d. are provided by incorporation therein, as at least a portion of the fuel, of ground paper (preferably non H_2O -absorbent) derived from either natural or synthetic fibers or both. Such compns. comprise mixts. of an oxidizer such as a nitrate, perchlorate, or chlorate of NH_3 and alkali metal or alk. earth metals in amts. up to 81% or more, an explosive sensitizer such as **nitrostarch** (preferred), TNT, PETN, trimethylolethane trinitrate, pentolite, cyclotol, and compn. B 5-30, and ground paper 20 (preferably 4-16%). Up to 30% (preferably 0.5-20%) conventional carbonaceous fuel or 0.5-15% metal (Al and Al alloys, ferrosilicon, and ferrophosphorus) fuels, 0.3-2.0% antacid, 0.5-30% liq. slurring agent, and small amts. of thickeners such as guar gum, CMC, psyllium seed mucilage, pregelatinized starch, silica aerogels, Al_2O_3 , attapulgate, and bentonite may also be present. Thus, a mixt. contg. granular NH_4NO_3 81.50, petroleum oil 1.50, celite 1.00, and ground parchment paper 16.00% is a low-d. explosive powder (0.350), ballistic pendulum value 11.9. The d. of a control in which bagasse was substituted for ground paper was 0.420. In another formulation, replacement of a portion of the fuel, specifically 3.5% starch, with 3.5% ground parchment paper resulted in a decrease in d. from 1.44 to 1.32, a ballistic pendulum value increase from 11.05 to 11.35, and an increase in cap sensitivity from No. 10 to No. 2.

~2 Citings

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38. Dry-appearing explosive compositions containing a porous material capable of releasing absorbed liquid at extrusion pressures

By Griffith, George L.

From [U.S. \(1967\)](#), [US 3345224 19671003](#), Language: English, Database: CAPLUS

Solid particulate explosives of generally conventional compn. that can be extruded continuously at a safe pressure of ≤ 50 psi. into plastic tubes are provided by incorporation into the explosive of liquid-contg. porous particles, preferably < 6 mesh, of expanded vermiculite, silica aerogels, Al_2O_3 , SiO_2 flour, and bentonite and org. compds., which also serve as fuels, which are preferred for use with oil as they release H_2O in the mixer, such as polyurethane, nylon, cellulose, poly(vinyl chloride), and rubber sponges in a sufficient amt. to contain 0.5-20% expressible liquid. At extrusion pressures, such particles yield their absorbed liquid to transform the mixt. into a semisolid or thixotropic compn. which extrudes readily and then reabsorb the liquid to give a solid self-supporting column. Thus, a mixt. contg. wet **nitrostarch** (23% H_2O) 17.0, NH_4NO_3 (ground prills) 53.0, granular NaNO_3 15.0, ZnO 0.6, flake Al 1.75, $\text{Na}_2\text{S}_2\text{O}_3$ 0.3, no. 5 oil 0.25, pecan meal 3.0, CM-cellulose 1.3, guar gum 0.3, and no. 2 vermiculite (contg. < 2.25 times its wt. of H_2O) 7.0% were blended in a paddle mixer, passed through a no. 4 screen, and extruded easily into 1.25×14 -ft. plastic tubes at 15-30 psi. to give dry-appearing self-supporting columns, detonator sensitivity no. 16 cap, ballistic pendulum value 10.1, d. 1.41 g./ml., and H_2O content 8.24%. Sep. addn. of the vermiculite and H_2O in this type of material cause immediate balling in the mixer.

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39. Stabilization of polymeric carbohydrate nitrates. Stability of dextrin nitrates

By Mustafa, Ahmed; Dawoud, Abdel F.; Marawan, Ashraf

From [Staerke \(1967\)](#), [19\(11\)](#), 358-62. Language: English, Database: CAPLUS, DOI:10.1002/star.19670191103

Dextrin (I) and starch (II) were nitrated with HNO_3 , 9:1 HNO_3 - Ac_2O , or 38:62 HNO_3 - H_2SO_4 , and the stabilities of the nitrates obtained were compared. I nitrate (III) prepd. using HNO_3 or HNO_3 - Ac_2O was less stable than II nitrate (IV) prepd. by the same method, while for nitration with HNO_3 - H_2SO_4 , the order was reversed. For nitrates prepd. by the latter method, I showed a lower total S content than II. Similarly, boiling with water or Na_2CO_3 soln. tended to stabilize III and IV prepd. with HNO_3 or HNO_3 - Ac_2O , but decreased the stability of those prepd. with HNO_3 - H_2SO_4 . III prepd. with HNO_3 were completely sol. in EtOH, while those prepd. with HNO_3 - H_2SO_4 were only partially sol. IV were only partially sol. in both cases.

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40. Explosive slurries from ammonium nitrate solutions and process for preparing the same

By Griffith, George L.

From [U.S. \(1967\)](#), [US 3337380 19670822](#), Language: English, Database: CAPLUS

Inorg. nitrate-based **nitrostarch** (I)-sensitized slurries contg. ~ 10 -50% H_2O , which are impact resistant but far more sensitive to detonating agents than are corresponding conventionally prepd. slurries are provided by cooling a satd. aq. NH_4NO_3 soln. held at at least 210°F . (preferably 225 - 50°F .) and contg. $> 80\%$ dissolved NH_4NO_3 to $< 125^\circ\text{F}$. (preferably $< 100^\circ\text{F}$.) with rapid agitation to obtain a fine grained NH_4NO_3 slurry to which is then added 2-30% I and other ingredients as desired, the porous nature of the I apparently allowing it to become satd. with NH_4NO_3 soln. with improvement in its sensitivity to detonating agents. Other inorg. nitrates conventionally used in explosive mixts. may be mixed with the NH_4NO_3 and other conventional sensitizers may be mixed with I if desired. Desirably, 0-10% conventional thickening and gelling agents, 0.5-30% conventional fuels, including metals, and up to $\sim 5\%$ conventional antacids are also added. Thus, a satd. soln. contg. 498 lb. NH_4NO_3 and 102 lb. H_2O at 214°F . was passed to a Holo-Flite processor and a fine-grained slurry contg. 16.19% H_2O at 104°F . obtained. To 64 parts of this was added a mixt. contg. wet I 22.4, milled NaNO_3 10, ZnO 0.8, bituminous coal 1.5, oil no. 5 0.5, and guar gum 0.8 part. The explosive slurry obtained after mixing had the following characteristics: d. 1.44, ballistic pendulum value 10.10, sensitivity (in a 1.5-in. pipe) 10 g. Pentolite, detonation rate 4987 m./sec. A similar slurry prepd. by using 53.1 parts NH_4NO_3 prills and 10.9 parts H_2O to replace 64 parts NH_4NO_3 slurry from the Holo-Flite processor had a d. of 1.41, ballistic pendulum value 10.35, a sensitivity (in a 1.5-in. pipe) 30 g. Pentolite.

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41. Stability of the nitrates of starch, amylose, and amylopectin

By Mustafa, Ahmed; Dawoud, Abdel F.; El-Shorbani, Salah

From [Staerke \(1967\)](#), [19\(7\)](#), 212-18. Language: English, Database: CAPLUS, DOI:10.1002/star.19670190704

cf. CA 58: 654d. Whole starch, amylose, and amylopectin were nitrated by HNO₃/H₂SO₄ and by HNO₃ alone. The stabilities of the products were compared. The total sulfate impurities of amylopectin nitrate were similar to whole starch nitrate, while those of amylose nitrate were lower. The best stabilization, as measured by the Bergmann-Junk test, of the mixed acid products was obtained by boiling for 2 hrs. with H₂O at 130° followed by boiling with 0.075% Na₂CO₃ for 24 hrs. Bergmann-Junk values (mg. N/g. sample) in the order of nitration products of starch, amylopectin, and amylose were 1.7, 1.75, and 1.7. Direct boiling with Na₂CO₃ was less effective: 2.5, 2.6, 2.5. For the HNO₃ products, boiling for 2 hrs. with H₂O at 135° gave 2.8, 3.1, and 2.6; and followed by 12 hrs. reflux with Na₂CO₃ gave 1.5, 1.5, and 1.4, resp. Direct boiling with Na₂CO₃ for 96 hrs. gave 1.6, 1.6, and 1.5, resp., and thus approached the stability of cellulose nitrate (1-1.25).

~1 Citing

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42. Presplitting blasting composition and assembly

By Schwoyer, William L. K.; Dowling, Thomas P.

From [U.S. \(1967\)](#), [US 3332349 19670725](#), Language: English, Database: CAPLUS

An improved presplitting explosive (for establishing a shear plane in a rock formation before final blasting) and a simple means of application are described. The explosive consists of 6-25% [nitrostarch](#), preferably fine grained, 50-75% NH₄NO₃ and 0-10% NaNO₃, both preferably fine grained, 0-25% metal fuel, 0-40% conventional carbonaceous fuels including bulking fuels, such as bagasse; 0-5% antacid, such as ZnO, CaCO₃, or Al₂O₃; and 0-10% inert bulking agent, such as expanded vermiculite, silica aerogel, fumed silica, and silica flour. Thus, a mixt. of 20% [nitrostarch](#), 60% NH₄NO₃, 5% NaNO₃, 5% bagasse; 2% each of sawdust, nut meal, oil hulls, and vermiculite; 1.65% Al₂O₃; 0.10% ZnO; and 0.25% oil no. 5 is loaded into cartridges, which are held end-to-end in a continuous column of any desired length by couplers, which also hold an initiating detonating fuse line near or against the cartridges. Proportions of ingredients and diams. of cartridges are varied to produce the desired loading d. of 0.15-1.5 lb./ft. of drill hole required for the specific presplitting operation.

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43. Electrically fired explosive fasteners and compositions

By Schulz, William Earle

From [U.S. \(1967\)](#), [US 3332311 19670725](#), Language: English, Database: CAPLUS

A hollow explosively expanded fastener which is fired elec. is described. The explosive charge, which has a resistance of 10-200 ohms and which fires in 10-100 msec. upon passage of an elec. current, usually of 100,000-500,000 ergs, comprises ≥50 (preferably ≥60)% fine Pb(N₃)₂, 4-50 (preferably 10-30)% of an elec. conducting powder consisting essentially of amorphous C and 70-95% graphite; for use with fasteners of low ductility, up to 15 (preferably 8)% heat-sensitive explosive diluent such as tetracene or the complex salt of Pb(NO₃)₂ and the dibasic Pb salt of 4,6-dinitro-o-cresol is included in the charge. For use in brass fasteners with open ends, ~30% nitromannite and 70% conductive powder are used to avoid possible formation of unstable Cu(N₃)₂. For ease of handling and loading and to prevent segregation, the mixt. preferably is grained with up to 20% of a graining agent, such as nitrocellulose, [nitrostarch](#), natural gums, alkyl celluloses, and (or) silicone elastomers.

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44. [Nitrostarch](#) explosives containing slowly hydratable guar gum

By Griffith, George L.

From [U.S. \(1967\)](#), [US 3330706 19670711](#), Language: English, Database: CAPLUS

Explosive compns. contg. 50-75% of a preferably fine-grained conventional oxidizer, such as a nitrate, chlorate, or perchlorate, and esp. a mixt. of 80-90% NH_4NO_3 and 10-20% NaNO_3 , 15-30% sensitizing explosive, such a moist **nitrostarch**, alone or in combination with other conventional sensitizing explosives, as latent moist-**nitrostarch** sensitizer, a slowly hydratable guar gum modified to have a rate of hydration such that in the presence of sufficient H_2O at 25° to form a 1% soln., ≥ 1 hr. is required for the soln. to reach a viscosity of 2000 cp. in such amt. as to be present to the extent of 5-50% of the H_2O present. Suitably slowly hydratable guar gums are prepd. by known means, such as by dialdehyde treatment, or partial boration, etherification, or esterification. Carbonaceous and (or) metal fuels and antacids may also be present. Thus, mill NH_4NO_3 61.8, NaNO_3 9.1, ZnO 0.3, flake Al 2.3, and oil no. 0.5 were mixed for 2 min., **nitrostarch** (contg. 23% H_2O) 26 and guar gum (Jaguar 537-Z-8 which hydrates at a rate such as to form a soln. having a viscosity of 5-8 cp. in 5 min. and 265 cp. in 120 min.) 20 parts added, mixing continued for 2 min., and the mixt. screened and packed in 1.25×8 -in. cartridges. After only 1 day, this material fired with a No. 6 cap: a control contg. no guar gum failed to fire with 3 g. PETN after 3 days.

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45. Explosive conitrates and process for preparing the same

By Griffith, George L.

From [U.S. \(1967\)](#), [US 3300348 19670124](#), Language: English, Database: CAPLUS

Nonsegregating explosive conitrates having relatively low impact sensitivities and higher rates of detonation and higher initiation sensitivities than mech. mixts. of the individual nitrates which are particularly useful as sensitizing explosives are provided by nitration, preferably with a mixt. of HNO_3 and sufficient H_2SO_4 to inhibit soln. of the nitric esters in the nitration medium, of a mixt. of a com. starch, preferably corn starch, and a polyol or polyol deriv. such as pentaerythritol (I), (preferred), its hydroxy esters, dipentaerythritol and higher pentaerythritols, mannitol, sorbitol, erythritol, trimethylolpropane, and neopentyl glycol. The materials may be nitrated consecutively or simultaneously. Thus, about 1 lb. of fine I is added incrementally to 10 gal. of a stirred mixt. of 38% HNO_3 and 62% H_2SO_4 held at 35°F ., the temp. raised to 40°F . and about 4 lb. cornstarch added incrementally over 5 hrs., the nitration mixt. transferred to 100 gal. cold H_2O to give a nonsegregating conitrate (II) contg. ~80% **nitrostarch** and 20% I tetranitrate. With a 10-kg. hammer impact, sensitivity of II is 60 cm. the value for an 80:20 mech. mixt. of the two individual nitrates is 35 cm. A conventional blasting slurry contg. 13.1% II in a confined 1.5-in. diam. column is sensitive to initiation with 2 g. PETN: an identical slurry contg. 13.1% **nitrostarch** instead of II requires 10 g. Pentolite for initiation under identical test conditions.

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46. Stabilization of starch and cellulose nitrates

By Mustafa, Ahmed; Dawoud, Abdel Fattah

From [Explosivstoffe \(1966\)](#), [14\(11\)](#), 241-7. Language: English, Database: CAPLUS

The stabilities of crude starch and cellulose, nitrated with com. mixed acids, and stabilized by long-boiling or by kier-boiling, were compared. Boiling for 60 hrs. with water, followed by boiling for 24 hrs. with 0.02% Na_2CO_3 soln. is more effective for starch nitrate; but boiling at 120° with water under pressure for 3 hrs. followed by boiling for 24 hrs. with 0.02% Na_2CO_3 soln. is equivalent. Such treatments produce starch nitrate with a stability of 2.7 mg. N/g. of sample; cellulose nitrate, similarly treated, is much more stable, 1.1 mg. N/g. of sample. However, cellulose nitrated with HNO_3 - Ac_2O is inherently stable; kier-boiling does not improve the stability. Perhaps the difference in stability between cellulose nitrate and starch nitrate is related to their different glycoside linkages.

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47. Extruding explosives

By Griffith, George L.

From [No Corporate Source data available \(1966\)](#), [US 3265778 19660809](#), Language: Unavailable, Database: CAPLUS

A process is described whereby explosive compns. can be extruded into casings to form well packed columns of great length. The extrusion column of explosive is forced into and through the nozzle by a screw. The extrusion, at tolerable temps. and pressure, is made possible by a porous or perforated plate surrounding the explosive through which plate lubricant is applied to the column of explosive moving towards the nozzle. An example of an extrudable explosive compn. was prepd. using dry milled **nitrostar** 27.00, fine grained NH_4NO_3 47.25, grained NaNO_3 10.75, flake Al 2.50, guar gum 2.50, Oil No. 5 1.00, ZnO 1.00, and water 8.00%. The **nitrostar** and mixed nitrates were thoroughly blended and the other ingredients added in the order named above. The compn. was quite stiff, and was easily extruded through long 1.25-in. diam. extrusion nozzle. At an extrusion pressure of 25 psi. using water as the lubricant at a pressure of 35 psi., into a tubular polyethylene casing 10 ft. long and 2 in. in diam.

~1 Citing

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48. Extrudable explosive compositions of semisolid or thixotropic consistency

By Griffith, George L.; Knotts, George F.; Schwoyer, William L.

From [No Corporate Source data available \(1966\), US 3238074 19660301](#), Language: Unavailable, Database: CAPLUS

Compns. suitable for loading into explosive containers by extrusion are described. Semisolidity or thixotropicity of the explosive compn. is obtained by inclusion of $\leq 10\%$ flake Al, supplemented by other lubricants, such as finely divided graphite, mica, talc, Al stearate, or Zn stearate. Liquids such as H_2O , oil or other inert liquid may be included to impart sufficient fluidity to permit extrusion at < 30 psi. Gelling agents described in U.S. 2,655,476 (CA 48, 1670f) and 2,711,393 (CA 49, 13641a), and waterproofing agents described in U.S. 2,554,222 may be included. Sensitizing explosives, such as TNT, PETN, DNT, or RDX promote ease of detonation. In spite of the inclusion of sensitizing explosives, a booster is used. For example, an explosive mixt. of semisolid consistency was prepd. by using dry milled **nitrostar** 27.00, fine-grained NH_4NO_3 47.25, fine-grained NaNO_3 10.75, flake Al 2.50, guar gum 2.50, oil no. 5 1.00, H_2O 8.00, and ZnO 1.00%. The **nitrostar** and mixed nitrates were thoroughly blended, and the ZnO, Al, guar gum, and the oil and H_2O were then added. This compn. was quite stiff and non-fluid at room temp., but it was extrudable at 20 psi. through 1.25-in.-diam. extrusion nozzles into cartridges 2 ft. long and 2 in. in diam., made of heavy carboard 0.082 in. thick, to ~2.5 in. from the top. A booster charge with a well for a detonator was placed in the unfilled 2.5 in. The detonation rate of the cartridge was 5.5 km./sec.

~0 Citings

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49. Aqueous explosive slurries containing sulfur compounds having a low coefficient of expansion

By Schwoyer, William L.

From [No Corporate Source data available \(1965\), US 3222232 19651207](#), Language: Unavailable, Database: CAPLUS

Aq. or oil explosive slurries, based on inorg. nitrates and contg. Al as a fuel, which have a low coeff. of expansion and do not undergo any substantial degree of irreversible expansion during storage at elevated temps., are provided by the incorporation therein of inorg. thiosulfates of Na, K, Li, NH_3 , Ca, Ba, or Mg, or org. hydrocarbon sulfonate salts of alkali or alk. earth metals, or org. amines wherein the hydrocarbon group may be a C_{3-50} alkyl, aryl, arylalkyl, alkylaryl, or cycloalkyl radical, a preferred class of such sulfonates being ester-substituted. Thus, a thick slurry contg. 28.2% **nitrostar** (sensitizer), 45.1% NH_4NO_3 and 15.5% NaNO_3 (oxidizers), 1.9% flake Al and 0.3% oil #5 (fuels), 1% Na carboxymethyl cellulose and 0.7% guar gum (thickeners), 0.8% ZnO (antacid), 1.2% anhyd. $\text{Na}_2\text{S}_2\text{O}_3$, and 7.7% H_2O was prepd. at 66°F., loaded into 1.25 in.-diam., string-wound, 2-3 mil thick polyethylene cartridges, the cartridges held 7 hrs. at 100°F., 7.75 hrs. at 110°F., 7 hrs. at 110°F., and 7 hrs. at 125°F., the cartridges being cooled to 66°F. between each heating period and after the final one. The diam. increase was 0.25-1.5% (av. 0.81%). This slurry had a detonation velocity in a 2.25-in. diam. bore hole of > 5000 m./sec. With a similar slurry contg. no $\text{Na}_2\text{S}_2\text{O}_3$, 57% of the cartridges burst during the test. The remainder showed a diam. increase of 3.3-6.4% (av. 4.7%). The dodecyl ester of Na sulfosuccinic acid had a similar inhibitory effect on the expansion of such slurries.

~0 Citings

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50. Water-resistant explosive compositions

By Wells, Franklin B.; Rinkenbach, William H.

From [No Corporate Source data available \(1965\), US 3180773 19650427](#), Language: Unavailable, Database: CAPLUS

Com. fertilizer-grade ground bone meal is the waterproofing component of nitrate salt-based explosive compns. in order to give longer detonable life to borchole-loaded explosives. Thus, an explosive mixt. of dry **nitrostarch** 25.0, grained NH_4NO_3 51.6, grained NaNO_3 20.8, ZnO 0.3, mineral oil 0.3, and bone meal 2.0% was prepd. The bone-meal particle size (U.S. Standard screens) was: +20-mesh 0, -20 + 40 1, -40 + 60 3.5, -60 + 80 10.5, -80 + 100 39.0, -100 + 120 5.5, -120 + 230 24.0, and -230 16.5%. An immersion test of perforated 1.25 x 8-in.-diam. compn.-loaded cartridges in 24 in. of H_2O showed detonability after 144, but not after 168 hrs. A control compn. with no bone meal was tested and found to be useless after several hrs. immersion.

~0 Citings

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51. Starch, amylose, and amylopectin nitrates

By Mustafa, Ahmed; Dawoud, Abdel Fattah

From [Explosivstoffe \(1964\), 12\(10\), 227-33](#). Language: English, Database: CAPLUS

Starch, amylose and amylopectin nitrates were prepd. by nitrating the carbohydrates with a mixt. of HNO_3 and Ac_2O . Stability tests of the nitrates were carried out by the Bergmann-Junk method (cf. M., et al., CA 58, 654d; M. and D., CA 60, 359h). Amylopectin nitrate (I) was the least stable. Boiling the nitrates with water under pressure increased their stability. The I was degraded much more in the boiling treatment than the other 2 nitrates.

~0 Citings

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52. Sensitized oil-slurried explosives

By Griffith, George L.; Wells, Franklin B.

From [No Corporate Source data available \(1964\), US 3147163 19640901](#), Language: Unavailable, Database: CAPLUS

Explosive slurries of excellent power, brisance, and sensitivity, despite extremely low O balance, are provided by mixts. of 50-75% inorg. oxidizer; 15-25% explosive sensitizer; 1-25% metal fuel, such as particulate Al or ferrosilicon; 7-50% oil, such as kerosine, fuel oil, SAE 10-50 lubricating oils, and hydraulic oil; and 0-10% H_2O as both sensitizer and suspending medium. Oil thickeners, such as Cab-O-Sil, Ludox, Santocel ARD, Santocel C, alumina, and bentonite; gelling agents, such as carboxymethyl cellulose, Me cellulose, pregelatinized starch, psyllium seed mucilage, and guar gum; conventional fuels; and an antacid, such as ZnO , may be present in minor proportions. The inorg. nitrate, a blend of fine and coarse particles, contains 15-25 NH_4NO_3 and 75-85% alkali metal or alk. earth nitrate. Suitable sensitizers, preferably finely divided, are DNT, TNT, RDX, PETN, smokeless powder, pentolite, Composition B, and **nitrostarch** (preferred), and the oxidizer:sensitizer ratio is 4:1. The examples of this invention illustrate the inadequacy of the ballistic pendulum (B.P.) method for explosive power detn. in explosives contg. metal nitrates. The crater method, expressed as cu. ft. of earth moved/lb. of explosive buried at least 30 in. deep, was more reliable. Thus, a series of slurries contg. **nitrostarch** 20, mixed inorg. nitrates 55.6, flake Al 3, ZnO 0.3, Cab-O-Sil 0.1, 100 Saybolt Universal sec. paraffin oil 16, and H_2O 5% was prepd. One slurry contained 11% NH_4NO_3 and 44.6% NaNO_3 :d. 1.595, sensitivity (in 1.25 in. pipe) 5 g. cast pentolite, rate of detonation (r.o.d.) 5258 m./sec., B.P. 8.0, crater value 10 ft.³/lb. With an increasing proportion of NH_4NO_3 , the d., sensitivity, r.o.d., and crater value decreased and the B.P. rose: with decreased NH_4NO_3 the d., B.P., r.o.d., crater value, and sensitivity all decreased, the latter very sharply. Similar results were obtained when NaNO_3 was replaced by $\text{Sr}(\text{NO}_3)_2$ or $\text{Ba}(\text{NO}_3)_2$ or when the sensitizer used was PETN, RDX, ball powder, or fine TNT; the use of coarse TNT gave relatively unsatisfactory results.

~1 Citing

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53. Carbanilates. Reaction of starch with aryl isocyanates

By Wolff, Ivan A.

From [Methods in Carbohydrate Chemistry \(1964\), 4, 301-3](#). Language: Unavailable, Database: CAPLUS

7 references.

~0 Citings

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54. p-Toluenesulfonylation. Starch and amylose p-toluenesulfonates

By Roberts, Hugh J.

From [Methods in Carbohydrate Chemistry \(1964\), 4, 299-301](#). Language: Unavailable, Database: CAPLUS

5 references.

~2 Citings

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55. Sulfation. Triethylamine-sulfur trioxide complex

By Whistler, Roy L.; Spencer, W. W.

From [Methods in Carbohydrate Chemistry \(1964\), 4, 297-8](#). Language: Unavailable, Database: CAPLUS

11 references.

~4 Citings

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56. Phosphation with inorganic phosphate salts

By Paschall, Eugene F.

From [Methods in Carbohydrate Chemistry \(1964\), 4, 294-6](#). Language: Unavailable, Database: CAPLUS

8 references.

~14 Citings

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57. Nitration

By Goldfrank, Max

From [Methods in Carbohydrate Chemistry \(1964\), 4, 291-4](#). Language: Unavailable, Database: CAPLUS

13 references.

~0 Citings

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58. Starch formate

By Roberts, Hugh J.

From [Methods in Carbohydrate Chemistry \(1964\), 4, 289-90](#). Language: Unavailable, Database: CAPLUS

5 references.

~0 Citings

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59. Acetylation

By Wurzburg, O. B.

From [Methods in Carbohydrate Chemistry \(1964\), 4, 286-8](#). Language: Unavailable, Database: CAPLUS

4 references.

~48 Citings

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60. Starch nitrates

By Reinhardt, L.; Sieper, G. A.; Zimmermann, W.

From [Staerke \(1964\)](#), 16(4), 107-12. Language: Unavailable, Database: CAPLUS

A review is given of the properties, production, possible applications, and stabilization of **nitrostarch**. Lacquer produced from it is not of a sufficiently high quality, it has been used for production of explosives, but remains without technical significance.

~0 Citings

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61. Stabilization of starch nitrates with boiling water under pressure

By Mustafa, Ahmed; Dawoud, Abdel F.

From [Explosivstoffe \(1963\)](#), 11(8), 168-74. Language: Unavailable, Database: CAPLUS

Nitrostarch (I) has found little practical application as an explosive principally because of its instability. An attempt was made to obtain stable products by treating the I with boiling water under pressure (kier-boiling process). A suspension of 10 g. I in 150 ml. distd. H₂O was placed in the reactor of the autoclave. The samples were then heated with H₂O under pressure at different temps. (115-135°) for about 1 hr. The Abel heat test and the Bergmann-Junk test were used to determine the storage stability of the treated samples. The results show the efficiency of this treatment in removal of unstable impurities contaminating the I. They have also proved the importance of the kier-boiling process as a satisfactory method for stabilizing I.

~1 Citing

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62. Aqueous **nitrostarch** explosive slurries

By Griffith, George L.; Wells, Franklin B.

From [No Corporate Source data available \(1963\)](#), US 3083127 19630326, Language: Unavailable, Database: CAPLUS

Improved aq. explosive slurries having high power, brisance, and sensitivity to initiation and low sensitivity to impact are provided by mixts. contg. 10-30 (preferably 15-25)% **nitrostarch**, 35-75 (preferably 50-75)% inorg. nitrate, such as NH₄NO₃, alone or mixed with ≤75 parts alkali metal nitrate to 25 parts NH₄NO₃, the nitrate:**nitrostarch** ratio being 5-2:1, 10-40% H₂O, and conventional fuels and (or) powd. metals, thickeners, and neutralizers. Superiority of such slurries over conventional, coarse-grained TNT slurries is illustrated by a mixt. contg. **nitrostarch** 30, NH₄NO₃ 50, flake Al 30, and H₂O 31 parts having d. 1.24, ballistic pendulum value 12.5, sensitivity (in 2-in. pipe) 3 g. PETN, rate of detonation (r.o.d.) (in 2-in. diam. pipe) 5010 m./sec., and crater value 9.6 (cu. ft. of earth moved/lb.). A mixt. contg. **nitrostarch** 20, NH₄NO₃ 37, NaNO₃ 24.2, bagasse 1, Hydroseal 3B 3, 200 Saybolt viscosity mineral oil 1, sea coal 1.5, ZnO 0.3, and H₂O 16 parts had resp. values of 1.44, 8.8, 3, 5545, and 10.4. An increased NaNO₃ content makes all values except d. less desirable, while a decreased NaNO₃ content lowers the d. and crater value somewhat, improves the ballistic pendulum value, and has little effect on the other values. As NaNO₃ increases, the ballistic pendulum values drop as expected; hence this detn., unlike the crater value, is not reliable for power rating of explosives contg. metal nitrates.

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63. Stabilization of polymeric carbohydrate nitrates from studies on starch, amylose, amylopectin, and glycogen

By Mustafa, Ahmed; Dawoud, Abdel Fattah; El-Shourbani, Salah

From [Canadian Journal of Chemistry \(1962\)](#), 40, 2072-7. Language: Unavailable, Database: CAPLUS, DOI:10.1139/v62-318

Whole starch, amylose, amylopectin, and glycogen (polymeric carbohydrates of the α-D-glycosidic linkage type) were nitrated by HNO₃ in the presence of P₂O₅, and stability properties of the nitrated products were studied. Crude amylose nitrate is more stable than amylopectin nitrate, and the latter is less stable than the whole-starch nitrate, as judged by the Bergmann-Junk test. The stability of glycogen nitrate is closely similar to that of amylopectin nitrate. Appreciable stabilization of the crude nitrates was brought about by boiling with slightly alk. water for long periods (60-70 hrs.). All stabilized samples possessed closely similar stability properties. The Bergmann-Junk values of all nitrates examined ranged from 2.2 to 1.7 mg. of N per g. sample; the latter value seems to represent the max. stabilization which could be attained for the polymeric carbohydrate nitrates of the α-D-glycosidic linkage type. In the case of cellulose nitrate (β-D-glycosidic linkage type), Bergmann-Junk values of 1 to 1.25 mg. of N were obtained.

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64. Gelatinous explosive compositions

By Downard, Jack M.

From [No Corporate Source data available \(1962\)](#), US 3018201 19620123, Language: Unavailable, Database: CAPLUS

Detonative, gelatinous explosive compns. are provided by mixts. contg. 90-9% high explosive materials, such as esters of HNO₃, nitrocellulose, [nitrostarch](#), and cryst. high explosives, and 1-10% of a nonexplosive gel consisting of H₂O-insol. petroleum hydrocarbons in 5-20% of the gel wt. of a vulcanized copolymer of isobutylene and isoprene. Thus, GR-I-18 butyl rubber is dissolved in 10 times its wt. of toluene and sufficient Esso SAE-10 lubricating oil added to give a 15% soln. of rubber in oil after heat removal of toluene. Then there is added and thoroughly dispersed at room temp. 0.5% S and 2.0% a tetramethylthiuram disulfide. The mixt. is heated with stirring to 170° during 45 min. to give a gel, Brookfield viscosity at 40° 1570 poises. RDX (95%) is hand-kneaded into 5% of this gel to give a uniform product of good plasticity which is loaded into 1.25 in. x 8 in. cartridges, detonation velocity 7600 m./sec., gap sensitivity 3 in. A gelatinous explosive prep'd. from a nitroglycol-nitroglycerinNH₄NO₃ dynamite and 2% of the nonexplosive gel gives similar cartridges, detonation velocity 2945 m./sec., gap b sensitivity 4 in. Cf CA 45, 2670f.

~0 Citings

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65. Polymerization from the standpoint of polymers as rocketfuel components

By Lewanska, Kazimiera

From [Biul Wojskowej Akad. Tech. \(1961\)](#), 10(No. 111-12), 80-5. Language: Unavailable, Database: CAPLUS

As a rocket-fuel component, a 10% styrene-Me methacrylate copolymer was found to be superior in mech. properties and O value to either of the monomers. Nitro compds., e.g. p-nitrotoluene, 2,4-dinitro- toluene, 2,4,6-trinitrotoluene, m-dinitrobenzene, nitro-benzene, tetryl, and Hexogen were found to retard the polymerization, whereas nitrocellulose, [nitrostarch](#), pentrite (≤5%), and dinitrodiglycol catalyzed it. With nitro compds. or dinitrodiglycol as additives, excellent polymers were obtained.

~0 Citings

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66. Nitrostarch

By Zimmermann, Werner; Sieper, Gustav A.; Reinhardt, Lothar

From [No Corporate Source data available \(1961\)](#), US 2995549 19610808, Language: Unavailable, Database: CAPLUS

A process for the prep'n. of starch nitrate (I) having better stability than the I prep'd. from mixed HNO₃ and H₂SO₄ is provided by nitration through soln. of the starch in strong (at least 90%) HNO₃, followed by pptn., and washing with successively more dil. HNO₃, which wash solns. are recycled. Such washing prevents acid occlusion and permits the final acid removal by H₂O to produce a stable I. Thus, 500 g. cornstarch (<2% H₂O) is added with agitation during 30 min. to 1.7 l. of 98% HNO₃ in a 4-l. autoclave while the temp. rises to 35°. The mixt. is stirred at that temp. for 30 min. The clear soln. is blown by air at 1 atm. excess pressure through nozzles having a bore of 0.5 mm. into 45% aq. HNO₃. The acid is removed by suction, and the filter cake of grains, 0.1 mm. in diam., successively treated with 2 l. of 30% HNO₃, 1.8 l. of 15% HNO₃, and 1.6 l. of 5% HNO₃, and finally with H₂O to remove all acid. The cake is dried to give 790 g. (98%) of I contg. 11.8% N and having a viscosity of K = 27 (2 g. I in 100 cc. acetone). A similar treatment of 5 kg. potato starch with 1000 kg. 98% HNO₃ gives 80 kg. (99.2%) I contg. 13.3% N and having a viscosity of K = 35 (2 g. I in 100 cc. acetone). The I produced by this process can be completely stabilized conventionally.

~0 Citings

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67. Nitroacetylated starches

By Giua, Michele; Marchino, Maria Luisa; Benecchi, Emilio

From [Annali di Chimica \(Rome, Italy\) \(1960\)](#), 50, 1377-80. Language: Unavailable, Database: CAPLUS

A method of prep. mixed nitroacetic esters of starch is presented. It consists in submitting acetyl esters of starch to the action of a nitrating mixt. With an acetylated starch contg. 36.7% Ac groups, it is possible to prep. derivs. with different contents of N and Ac by using 40-70% HNO₃. In a nitrating mixt. contg. less than 40% HNO₃, the products with little or no N are obtained, while with mixt. contg. more than 70% HNO₃ a very low content of Ac results. Thus, 10 g. dried starch, 180 ml. Ac₂O and 400 ml. HOAc, were heated with stirring to 130°; the viscous mixt. was then poured into 4 vols. of distd. H₂O, and the pptd. white mass pulped till a suspension occurred; the decanted product was washed with H₂O, 5% Na₂CO₃, and distd. H₂O, pressed, and dried by means of an infrared lamp. The product gave neg. iodine test. To the acetylated starch powder, suspended in HOAc, HNO₃ was added and the soln. poured into distd. H₂O; the nitroacetylated starch pptd., was washed with 1% NH₄OH then H₂O. Results of elemental analysis of 3 esters are given. The deriv. contg. 3.44% N and 13.8% Ac was identified as triacetyldinitrotetra- α -glucopyranose.

~0 Citings

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68. Changes which starch undergoes during treatment with water and heat

By Stolyar, M. G.

From [Spirto-Vodochnaya Promyshlennost \(1961\), 27\(No. 1\), 10-16](#). Language: Unavailable, Database: CAPLUS

Potato starch in the presence of H₂O was subjected for various periods of time to temps. between 20 and 200°. Four endothermal effects occurring at 55-63, 104-6, 121-6, and 132-8° were observed, which correspond to changes in the starch grains and dissolving of parts thereof, which can be observed also under the microscope. The endothermal effect at 55-63° corresponds to paste formation, at 104-6° to the bursting of the starch grains, which prior to such destruction have increased their size roughly 9 times. By heating rapidly (8°/min.) well-defined shapes are recognized at 180°, above which temp. peptization sets in.

~0 Citings

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69. Nondusting nitrostarch composition

By Wilt, Paul E., III; Nelson, Richard G.

From [No Corporate Source data available \(1961\), US 2968541 19610117](#), Language: Unavailable, Database: CAPLUS

A nondusty nitrostarch (I) is provided by adding to I 0.5-5.0% (preferably 0.75-1.25%) of a tacky polybutene within the viscosity range in Saybolt Universal sec. of 180(100°F.) to 2700(210°F.) and preferably 135-620(210°F.) or by adding a tacky soln. of a rubbery polybutene, natural rubber, or synthetic rubber in a liquid polybutene. Preferably, the tacky material is added as an emulsion, and the mixt. is then dried. Emulsifiers, such as certain polyoxyethylene tallow amines or polyoxyethylene ethers of higher fatty alcs.; stabilizers, such as 0.5-1.0% urea, Ph₂NH, or NH₄ phosphate; and desensitizers, such as 0.25-100% mineral oil, are included. Thus, an emulsion was prepd. from urea 1.4, polyoxyethylene (20) tallow amine 0.2, H₂O 5, kerosine 0.8, and polybutene (400 Saybolt Universal sec. at 210°F.) 1.65 g. and applied by medicine dropper to 165 g. wet I on a centrifugal filter. The I was air-dried to 1% H₂O to give a nondusty powder which showed no measurable static build-up. Untreated I dried to the same extent was dusty and gave a static build-up of 360 v.

~0 Citings

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70. Hydrolysis and analysis of nitric acid esters ("nitro compounds")

By Schulek, E.; Burger, K.; Feher, M.

From [Fresenius' Zeitschrift fuer Analytische Chemie \(1960\), 177, 81-6](#). Language: Unavailable, Database: CAPLUS

cf. CA 53, 19672i. The N-contg. products of the alk. hydrolysis of glycerol trinitrate (I), pentaerythritol tetranitrate (II), nitrocellulose (III), and nitrostarch (IV) were NH₃, CN⁻, NO₂⁻, and NO₃⁻. Quant. amts. of the hydrolysis products of II produced under different conditions and of all of the esters hydrolyzed under identical conditions are given. The ratios of the 4 products formed under identical conditions are characteristic of the individual compds.: NO₂⁻/NO₃⁻ = 0.83 for II; 1.46, III; and 2.14, I and IV. Only II formed no CN⁻. Reducing compds., formed during the hydrolysis, account in part for redn. of NO₃⁻.

~1 Citing

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71. Nitrostarch

By Reinhardt, Lothar; Sieper, Gustav A.; Zimmermann, Werner
From [No Corporate Source data available \(1958\), DE 1028981 19580430](#), Language: Unavailable, Database: CAPLUS

See Brit. 815,280 (CA 53, 18487d).

~0 Citings

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72. Stabilization and purification of starch nitrates

By Zimmermann, Werner; Sieper, Gustav A.; Reinhardt, Lothar
From [No Corporate Source data available \(1958\), DE 1031300 19580604](#), Language: Unavailable, Database: CAPLUS

Nitrated starch is stabilized and purified by washing with boiling aq. MeOH. Thus, nitrated starch contg. 12.7% N was washed with cold 45-50% MeOH and then heated twice with addnl. 45-50% MeOH for 5 hrs. After filtering and drying, a sample of the starch nitrate did not evolve red fumes on heating for 2 hrs. in the Bergman-Junk test, and the amt. of split-off NO was only 2.3 cc. Another sample of the product washed only with H₂O was unstable.

~0 Citings

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73. Infrared spectrophotometric determination of nitrostarch in XC-9 initiation mixture

By Fletcher, Aaron N.
From [United States Department of Commerce, Office of Technical Services, PB Report \(1959\), 135 135, 19 pp.](#)
Language: Unavailable, Database: CAPLUS

An infrared spectrophotometric method has been developed for the detn. of nitrostarch in the supernatant liquid of XC-9 initiation mixt. The liquid sample is filtered and evapd. to dryness. Acetone is added, and the absorbance at 11.8 μ is detd. An iterative or a quadratic method is used to calc. the amt. of nitrostarch present. The precision is reflected by a percentage coeff. of variation of 0.4. The accuracy is calcd. to be within $\pm 4.5\%$ of the amt. present for a nominal compn. of 2.72 g. of nitrostarch/100 g. of solvent.

~0 Citings

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74. Propellant powders

By Maag, Raymond H.; Foster, Jack J.
From [No Corporate Source data available \(1960\), US 2923613 19600202](#), Language: Unavailable, Database: CAPLUS

Propellant grains having a porous interior and a thin dense outer layer are prepd. by treating the grains suspended in at least 5 times their wt. of a liquid, such as H₂O (preferred), glycerol, C₆H₆, or chlorinated hydrocarbons with 1.2-2.2 parts/part propellant of a solvent, such as AcOEt (preferred), AcOMe, iso-PrOAc, Me iso-Bu ketone, or MeCOEt, which is at least partially immiscible with the suspending liquid. About 0.6-3% of a solute such as Na₂SO₄ is added while the solvent is removed from the grains. When the suspending liquid is H₂O, a protective colloid, such as starch or animal glue, is added. The propellant may be further modified by treatment with nitroglycerine or TNT prior to removal of the solvent. The process is applicable to nitrocellulose single- or double-base propellants, nitrostarch, poly(vinyl nitrate), and other polymerizable polynitro bases. Thus, 50 parts gelatinized nitrocellulose spheres, as described in U.S. 2,160,626 (cf. C.A. 33, 7175⁴), having a d. of 0.95, was suspended in 450 parts H₂O contg. 3 parts animal glue. The agitated slurry was heated to 50°, 100 parts AcOEt was added gradually during 1 hr., and agitation was continued for 3 hrs. at 50°. Then 25 parts of a soln. contg. equal amts. of nitroglycerin and AcOEt was added gradually during 1 hr. at 50° and agitation was continued for 3 hrs. with a slow temp. increase to 72°. The temp. was further increased to start distn. At 76°, the temp. was maintained, and 9 parts granular Na₂SO₄ was added. Then the temp. was increased to 99°. The slurry was then allowed to cool, and the liquid was removed by filtration to give porous spheres with a hard outer layer, having a d. of 0.85.

~0 Citings

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75. Nitration studies with acid mixtures. II. Use of the improved Barger method for the determination of the molecular weight of macromolecular substances. Further investigations of the degradation of starch nitrate in acid mixtures

By Kunz, Alfons; Giber, Janos; Dobis, Otto

From [Acta Chimica Academiae Scientiarum Hungaricae \(1959\)](#), 20, 275-83. Language: German, Database: CAPLUS

cf. C.A. 52, 11755d. The Barger method (Proc. Chem. Soc. 19, 121(1903)), in the form improved by Szabó and Szoke (C.A. 46,321e), was applied to the detn. of the mol. wt. of starch nitrate (I) with a relative error limit of $\pm 2\%$. The degradation of I was studied in 3 different acid mixts.: 70% HNO₃, 20% H₂SO₄, 10% H₂O; 85% HNO₃, 7.5% H₂SO₄, 7.5% H₂O; 64% HNO₃, 26% H₃PO₄, 10% P₂O₅. No degradation of I took place in the 3rd mixt. In the 1st and 2nd mixt. I degraded, in the 1st to a greater extent. The value of consts. were established, applying the Staudinger equation as modified by Mark: $\alpha = 0.52$, $K = 0.99 \times 10^{-2}$.

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76. Nitrostarch

By Zimmermann, Werner; Sieper, Gustav A.; Reinhardt, Lothar

From [No Corporate Source data available \(1959\)](#), GB 815280 19590624, Language: Unavailable, Database: CAPLUS

A soln. of starch in concd. HNO₃ is introduced in finely dispersed form into aq. HNO₃ of concn. <40% and free of H₂SO₄. Pptn. is aided by use of fine nozzles of the "Schlick" type to generate vibrations in the soln. The pptd. starch nitrates may be subjected to a final wash in stages with aq. HNO₃ of progressively diminishing concn. and finishing with pure H₂O. The product is useful as a substitute for collodion cotton of very low viscosity.

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77. Globular propellant

By Cook, Ralph L.; Andrew, Eugene A.

From [No Corporate Source data available \(1959\)](#), US 2888713 19590602, Language: Unavailable, Database: CAPLUS

A continuous process for the rapid, simple, and economical prepn. of globular or near-globular gelatinized propellant-base particles from droplets of lacquer contg. the base is provided by suspension of the lacquer particles in a nonsolvent medium, mixing with an excess of the same medium at an elevated temp. such that the entire mixt. is above the b.p. of the solvent which is then driven off rapidly to produce the desired propellant grains. Thus, a lacquer is prepd. by mixing 1.5 parts nitrocellulose (I) of which 0.5 part H₂O with 4 parts AcOEt contg. about 1% 2-nitrodiphenylamine and 0.25% chalk at 65° for 0.5 hr. to give a soln. of I. At the same time, a suspending mixt. is prepd. by heating together H₂O 100, Na₂SO₄ 3.4, animal glue 17, AcOEt 0.5 part at 65° with agitation to give complete soln. Two parts of the latter and 1 of the former mixt. are then mixed in a grainer to form granules about 0.010 in. in diam. Five parts suspending mixt. at 128° was added at 40 lb./sq. in. to 1 part of the original suspension. The mixt. was removed to a flash chamber under slight vacuum, the residual AcOEt and water removed by centrifuging, and the solid matter washed and dried to give a propellant having particles 0.002-0.004 in. in diam. and a d. of 1.54. Propellant grains up to 0.035 in. in diam. can be prepd. by this process. Nitrostarch and poly(vinyl nitrate) can be used instead of I.

~0 Citings

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78. Nitrostarch

By Grageroff, Ignace A.

From [No Corporate Source data available \(1959\)](#), US 2883376 19590421, Language: Unavailable, Database: CAPLUS

A process for the prepn. of nitrostarch with improved stability is provided by completely dissolving the starch (corn starch preferred) in a 55% aq. HNO₃ soln. at -5° and then, in the same container, nitrating the clear soln. thus produced by adding thereto mixed nitrating acids and recovering the nitrostarch by the customary methods. Thus, 10.72 g. dry cornstarch powder is added with agitation to 224 g. of 55% HNO₃ while the temp. is held at -5°. When soln. is complete, 556 g. of a mixed acid contg. H₂SO₄ 79.91, HNO₃ 19.73, NO₂ 0.32, and H₂O 0.04% is added slowly with continued agitation and cooling to -5°. The nitrostarch is recovered from the spent acid by filtration, washed with 1% NH₄OH, ground to a fine consistency, washed with water at 70°, and dried at about 70°. If the product fails to pass a 45-min. Abel test, it is rewashed.

~0 Citings

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79. Starch nitrate

By Caesar, George V.

From [Advances in Carbohydrate Chemistry \(Melville L. Wolfromm and R. Stuart Tipson, editors. Academic Press Inc., New York\) \(1958\), 13, 331-45](#). Language: Unavailable, Database: CAPLUS

Reviews with references; cf. C.A. 51, 2571fa.

~2 Citings

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80. Blasting explosives

By Griffith, Geo. L., Jr.; Samuel, David G., Jr.

From [No Corporate Source data available \(1958\), US 2860041 19581111](#), Language: Unavailable, Database: CAPLUS

A process is provided for prepg. blasting explosives that are relatively nonsensitive and nonhazardous in handling and manuf. but which acquire full sensitiveness by the time the explosive is to be used through incorporation into a mixt. contg. a damp, nitrated hydrocarbon, such as **nitrostarch** (I) and the other normal ingredients of blasting dynamites up to about 5% of an org. hydrophylic but not hygroscopic latent sensitizer (water absorber), such as locust-bean ext., gum karaya, or Na carboxymethylcellulose (II) which absorbs the water from the damp I to sensitize the mixt. and in so doing forms a gelatinous layer on the particles which aids in preventing penetration of external water. The sensitizer is of such fineness that at least 80% passes a standard 30-mesh screen. Thus, NH₄NO₃ 51.8, NaNO₃ 16.1, Al powder 2.7, II 1.0, pecan meal 1.0, petroleum oil 0.4, ZnO 0.3, and moist I (contg. 20% water) 33.4 parts are thoroughly mixed to produce a dynamite of high strength and a standard d. of 1.30 which is sensitive to a no. 16 cap 1 hr. after mixing and to a no. 1 1/2 cap 16 hrs. thereafter. The use of I contg. 25% water and 5 parts II gives a dynamite of standard d. 1.38 which is sensitive to no. 16, no. 8, and no. 1 1/2 caps 1, 16, and 40 hrs., resp., after mixing. Locust-bean ext. and gum karaya give substantially identical results.

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81. Nitration studies with mixed acid I. **Nitrostarch; nitration period; degradation**

By Kunz, Alfons; Toth, Istvan

From [Acta Chimica Academiae Scientiarum Hungaricae \(1957\), 13, 385-95](#). Language: German, Database: CAPLUS

On addn. of a suspension of 1 g. starch in 5 ml. CCl₄ to a mixed acid kept in a well thermostated Dewar flask agitated with an efficient vibrator, nitration takes place practically instantaneously, i.e., within 0.0-10.0 sec. The magnitude and duration of the rise of the temp. in the mixt. was measured and the N content of the product was detd. with different HNO₃-H₂SO₄-H₂O mixts. A linear relationship was found between the activity of the HNO₃ in the mixed acid and the velocity of the nitration, as well as between the temp. of the reaction and its duration. Addnl. experiments showed that the esterification itself is not a very exothermal reaction. The degradation of the starch, evaluated by measuring the specific viscosity of the product, was rather rapid with the unnitrated starch and very much slower with the nitrated starch. The degradation velocity is very much dependent on the temp. of the reaction.

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82. Nitration studies with mixed acid I. **Nitrostarch; nitration period; degradation**

By Kunz, Alfons; Toth, Istvan

From [Magyar Kemiai Folyoirat \(1957\), 63, 201-6](#). Language: Unavailable, Database: CAPLUS

On addn. of a suspension of 1 g. starch in 5 ml. CCl_4 to a mixed acid kept in a well thermostated Dewar flask agitated with an efficient vibrator, nitration takes place practically instantaneously, i.e., within 0.0-10.0 sec. The magnitude and duration of the rise of the temp. in the mixt. was measured and the N content of the product was detd. with different HNO_3 - H_2SO_4 - H_2O mixts. A linear relationship was found between the activity of the HNO_3 in the mixed acid and the velocity of the nitration, as well as between the temp. of the reaction and its duration. Addnl. experiments showed that the esterification itself is not a very exothermal reaction. The degradation of the starch, evaluated by measuring the specific viscosity of the product, was rather rapid with the unnitrated starch and very much slower with the nitrated starch. The degradation velocity is very much dependent on the temp. of the reaction.

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83. Nitrate explosives

By Russell, Edward J.

From [No Corporate Source data available \(1958\), US 2821466 19580128](#), Language: Unavailable, Database: CAPLUS

Water-resistant blasting dynamite mixts. of 5-49% **nitrostarch** (I) gelatinized with 0.5-30% 1,1,1-tris(hydroxymethyl)ethane trinitrate (II) are prepd. by mixing at room temp. 5 or more parts by wt. of I (contg. up to 13% N) with up to 100 parts by wt. II which dissolves to the extent of about 1.5 parts while the remaining granules become soft and jellylike. This adhesive material serves to moistureproof explosive compns. contg. water-sol. nitrates of such particle size that 100% passes a 10-mesh and <50% passes a 120-mesh screen. Thus, water resistant semigel-type explosive compns. contg. 0-84.5% NH_4NO_3 , 0-54.5% NaNO_3 , 0.5-40% I, 5-30% II, 1.5-5% carbonaceous matter, and 0.5% CaCO_3 are prepd. A specific compn. contains 72% NH_4NO_3 , 3.5% NaNO_3 , 20% I, 1% II, 3% carbonaceous matter, and 0.5% chalk.

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84. Cast explosive

By Rinckenbach, Wm. H.; Carroll, Wm. J., Jr.

From [No Corporate Source data available \(1957\), US 2817581 19571224](#), Language: Unavailable, Database: CAPLUS

A powerful and relatively dense cast explosive which is safe to handle and transport and which is dependably detonatable under confinement is provided by mixing together 74-85 parts NH_4NO_3 of such particle size that it passes 10 mesh and less than 50% passes 200 mesh, 14-20 parts urea, and 1-6 parts of a sensitizing component contg. one or more sensitizers such as cyclonite, TNT, pentaerythritol tetranitrate, and powd. metals and alloys, such as Al, Mg, and ferrosilicon, mixing, screening several times through a 10-mesh screen, warming to 50-100° to form a relatively thick slurry, and casting into cylinders or blocks. Thus, 771 g. cryst. NH_4NO_3 , 179 g. urea, and 50 g. cyclonite are mixed thoroughly and passed several times through a 10-mesh screen. The mixt. is heated to 50° with stirring to form a mushy viscous slurry which is then cast. The solidified material does not detonate unconfined when boosted with 100 g. 60% dynamite but does so completely when confined in steel pipe. The bulk d. is 1.41 g./ml. Examples of the use of different proportions and of ferrosilicon, **nitrostarch**, and powd. Al are included.

~0 Citings

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85. Ignition delay composition

By Toshima, Tadashi; Honma, Kunio; Nakai, Kashichi; Yoshitomi, Hirohiko

From [No Corporate Source data available \(1955\), JP 30008498 19551121](#), Language: Unavailable, Database: CAPLUS

A delay compn. contg. BaO_2 83.0, p-nitrophenylazo-2-naphthol 1.5, **nitrostarch** 1.5, and Fe oxide 14.0% ignites at 350° and burns below 600° after a 4-sec. delay. The combustion residue dies out within 3 millise.

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86. Studies on **nitrostarch**: Stabilization and some explosive compounds

By Ahmad, Iqbal; Karimullah

From [Pakistan Journal of Scientific Research \(1954\)](#), 6, 133-5. Language: Unavailable, Database: CAPLUS

Washed and stabilized **nitrostarch** (13.1% N) was copptd. with 5 to 65% nitrocellulose (I), which at >37.5% I increased stability and made usable propellants.

~0 Citings

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87. Heat of formation of **nitrostarch**

By Smolenski, Dionizy; Strzondala, Jadwiga

From [Zeszyty Nauk. Politech. Wroclaw. \(1954\)](#), No. 4(Chem. No. 1), 49-56. Language: English, Database: CAPLUS

The heat of formation of nitro-starch (I) is a linear function of the degree of esterification. I was prepd. by treating starch either with a mixt. of HNO_3 and H_2SO_4 or by HNO_3 alone. The heat of formation of I obtained by HNO_3 is lower than the heat of formation of I obtained by $\text{HNO}_3 + \text{H}_2\text{SO}_4$, although the N content was the same. This may be due to the formation of sulfuric acid esters when HNO_3 and H_2SO_4 were used. Heats of formation in cal./g. were as follows: For I prepd. by HNO_3 alone: for 10.52% N 696.5, for 12.20% N 576.3, for 12.87% N 523.3, and for 13.34% N 504.5. For I prepd. by $\text{HNO}_3 + \text{H}_2\text{SO}_4$: for 10.52% N 702.4, for 11.02% N 668.3, for 12.65% N 560.0, for 12.87% N 555.5, and for 13.24% N 541.0.

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88. Explosive properties of the polyvinyl nitrates

By Le Roux, Albert; Sartorius, Robert

From [Memorial des Poudres \(1952\)](#), 34, 167-77. Language: Unavailable, Database: CAPLUS

Polyvinyl nitrates of 13.5 to 14.5% N and of viscosities of 5.7 to 43 poises at 20° for 10 g. in 100 cc. nitrobenzene gave stabilities comparable to that of **nitrostarch**. They ignited easily, burned rapidly, were detonated at d. of 0.6 by 0.3 g. mercury fulminate, gave coeff. of self excitation of 6 cm., gave velocities of detonation of 3520 m./sec. at d. of 0.6 and 5000 m./sec. at d. of 1.0, coeff. of utilization (picric acid = 100) of 102 to 113.5, and had drop sensitivity of about 1.50 m. for 2 kg. wt. The fragility of the compressed product and the necessity of using liquid solns. for plastic explosive above 10° appear to limit practical use of the material.

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89. Explosive properties of the nitrate of starch

By Le Roux, Albert

From [Memorial des Poudres \(1951\)](#), 33, 211-21. Language: Unavailable, Database: CAPLUS

Exptl. detn. of explosive properties of pure compd. and in mixts. of the Grenite and Trojan types.

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90. Preparation of the nitrate of starch

By Brissaud, Louis; Ronssin, Stanislas

From [Memorial des Poudres \(1951\)](#), 33, 199-210. Language: Unavailable, Database: CAPLUS

Historical review. 23 references.

~1 Citing

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91. The stability of penthrite

By Aubertein, Paul

From [Memorial des Poudres \(1951\), 33, 175-86](#). Language: Unavailable, Database: CAPLUS

Vacuum stability tests on penthrite (pentaerythritol tetranitrate) are used to study effects of pptn. methods on stability.

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92. Preparation of pentryl

By Desseigne, Gerard

From [Memorial des Poudres \(1951\), 33, 255-64](#). Language: Unavailable, Database: CAPLUS

2,4-Dinitrophenylethanolamine (I) is prepd. by treating ethanolamine with 1-chloro-2,4-dinitrobenzene. Nitration of I yields pentryl. The procedure is described.

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93. A process for the polymer-analogous nitration of strongly swelling carbohydrates, such as pectin and starch

By Vollmert, B.

From [Makromolekulare Chemie \(1951\), 6, 78-84](#). Language: Unavailable, Database: CAPLUS

For polysaccharides which are unstable in bases, such as polyuronic acid esters, and therefor cannot be acetylated or methylated without degradation, nitration is the only reaction suitable for obtaining derivs. for osmotic pressure and viscosity detns. in org. solvents. Some polysaccharides, e.g. starch and pectin, swell strongly in mixts. of HNO₃ with H₂SO₄ or H₃PO₄, and therefore the products are difficult to sep. They can be nitrated with N₂O₅, but the latter is difficult to prep. and preserve. Here a method is described whereby N₂O₅ is distd. directly from a P₂O₅-HNO₃ mixt. onto the sample in a high vacuum. The app. consists of 2 flasks connected together, and distn. from one to the other is carried out by immersing one in a freezing mixt. The reaction is carried out for 12-24 hrs. at 0 to -5°. For the nitration of 0.5 g. of substance, 5 cc. of HNO₃ is used. The process can be used for cellulose if longer reaction times and more N₂O₅ are used. It is shown by osmometry and viscometry that no degradation occurs during reaction times of 12-96 hrs.

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94. The chlorine oxidation of glycosides. I. Oxidation of methyl β-glucoside

By Dyfverman, Arne; Lindberg, Bengt; Wood, Dennis

From [Acta Chemica Scandinavica \(1951\), 5, 253-60](#). Language: English, Database: CAPLUS,

DOI:10.3891/acta.chem.scand.05-0253

The action of Cl water on Me β-glucoside (I) was studied. The chief product was D-gluconic acid (II), which was slowly oxidized to 5-ketogluconic acid (III). A similar reaction for Me α-glucoside (IV) was much slower. A slow stream of Cl gas was passed through a 0.5 M soln. of I at room temp. with exclusion of light, samples withdrawn at various times, the Cl removed from the samples by aeration for 10-15 min., and the optical rotation, total acid, HCl, and HIO₄ values obtained. After 14 days, a larger sample was removed, the Cl removed by aeration, 10 cc. of the soln. (IVA) neutralized with Ag₂CO₃, filtered, satd. with H₂S, the Ag₂S filtered off, the excess H₂S removed by aeration, the soln. neutralized warm with CaCO₃, filtered, concd. in vacuo to 5 cc., and the residue stirred into 100 cc. EtOH. The amorphous Ca salts (0.87 g.), [α]_D²⁰ 7.5° (H₂O, c 1) (the value for pure Ca gluconate is 8.5°), contained no OMe. A 10-cc. sample of IVA was freed from HCl, the filtrate concd. to 10 cc., 1.5 cc. glacial HOAc and 1 cc. PhNHNH₂ added, and the mixt. heated 1 hr., filtered, and let stand overnight at 0° to yield yellow crystals which were sepd., washed with Et₂O, dissolved in 350 cc. boiling EtOH, filtered, and kept at 0° 3 hrs.; the product (0.39 g.), recrystd. from EtOH, [α]_D²⁰ 13° (H₂O, c 1), m. 196° (decompn.), did not depress the m.p. of authentic II phenylhydrazide. The Ca salt of II (2 g.) with H₂O₂-Fe₂(SO₄)₃ (C.A. 28, 5047.1), yielded 0.1 g. D-arabinose. After chlorination had continued 40 days, 50 cc. soln. was withdrawn, freed from HCl, treated 2 hrs. with excess BaCO₃ at 40-5°, filtered, concd. in vacuo to 5 cc., 40 cc. EtOH added, and the Ba salts (1.70 g.) removed after several hrs., washed with EtOH and Et₂O, and dried; 1.0 g. of the Ba salts was dissolved in 2-3 cc. H₂O, the Ba removed with N H₂SO₄, 12 cc. EtOH and 38 cc. of a 10% alc. brucine soln. added, and the mixt. let stand overnight at 0° to yield 0.8 g. of the brucine salt of III, m. 172-3° (from H₂O), [α]_D²⁰ -26 ± 2°. A 0.5 N soln. of I was unaffected by 2 N HCl at room temp. Chromatographic expts. were carried out with BuOH-HOAc-H₂O (4:1:5) solvent, the chromatograms left in the vapor of the aq. phase 1 hr., the app. charged with the BuOH-HOAc phase, and the chromatogram run 16-18 hrs., dried at 100°, and developed with ammoniacal AgNO₃ (V) (5%), resorcinol (VI) (3% in 5% alc. HC), and methyl orange indicator soln. (VII).

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95. Mechanism of the nitration of starch

By Israelashvili, Shalom

From [Nature \(London, United Kingdom\) \(1950\), 165, 686](#). Language: Unavailable, Database: CAPLUS, DOI:10.1038/165686a0

Conditions which favor the formation of the nitronium ion (NO_2^+) lead to starch nitrates of high N content. The formation of starch nitrates may be due to an attack of the nitronium ion on a lone electron pair of the hydroxyl O, followed by elimination of a proton from the intermediate product.

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96. Ignition composition

By Trevorrow, Wm. D.

From [No Corporate Source data available \(1949\), US 2487906 19491115](#), Language: Unavailable, Database: CAPLUS

Ignition compns. comprising Pb styphnate and **nitrostarch** in a solvent are prevented from jelling by the inclusion of 1-20% of acetone in the solvent-resin formula. Cf. C.A. 44, 2247a.

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97. Ignition composition

By Trevorrow, Wm. D.

From [No Corporate Source data available \(1949\), US 2484131 19491011](#), Language: Unavailable, Database: CAPLUS

Gelling of ignition mixts. prior to application to the igniting element is prevented by addn. of a monohydric alc. contg. less than 6 C atoms. The alc. or mixts. of alcs. are added in amounts up to 20% by vol. of the nitrocarbohydrate-solvent portion of an ignition mixt. composed of the Pb salts of nitrophenols and **nitrostarch** or nitrocellulose.

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98. Explosive

By Cairns, Robert W.

From [No Corporate Source data available \(1947\), US 2430274 19471104](#), Language: Unavailable, Database: CAPLUS

Eight and one-half parts by wt. of **nitrostarch** are mixed with 1.5 parts EtOH, then mixed with 10 parts trinitrotoluene and allowed to dry at room temp. The dried mixt. is then heated at 80-95° until colloidized, then poured into molds; when cool it forms a fine-grained, homogeneous explosive.

~0 Citings

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99. Compound detonator

By Rolland, Guy F.

From [No Corporate Source data available \(1947\), US 2422043 19470610](#), Language: Unavailable, Database: CAPLUS

Compd. detonators contg. pentaerythritol tetranitrate (I) as a base charge are improved as regards safety in both manuf. and use by providing a superimposed initiating charge of approx. 75% diazodinitrophenol (II) mixed with 25% of a solid explosive org. nitrate (e.g. I, nitromannite, nitrodulcite, **nitrostarch**). The org. nitrate reduces the sensitivity of II. The initiating charge may be much smaller than that generally used, as little as 0.05 g. giving satisfactory initiation, an amt. which will not detonate tetryl.

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100. Studies on reactions relating to carbohydrates and polysaccharides. LXII. Effect of hot alkali on the nitrates of starch, amylose, and amylopectin

By Ashford, W. R.; Hibbert, Harold

From [Canadian Journal of Research, Section B: Chemical Sciences \(1947\), 25B, 151-4](#). Language: Unavailable, Database: CAPLUS

cf. C.A. 40, 7630.6. The nitrates of whole starch, amylose, and amylopectin were heated with standard NaOH and the relative consumptions of alkali detd. by titration. No denitration of these substances occurred in 15 min. with 0.3928 N NaOH Amylose nitrate (I) consumed 3.65 milliequivs. and amylopectin nitrate (II) 2.79 milliequivs. of NaOH whereas, amylose and amylopectin did not consume appreciable amts. of alkali. Therefore, the nitration of amylose formed more terminal aldehyde groups than the nitration of amylopectin. I was more stable (explosive) than II as shown by the Bergmann-Junk test. Cellulose nitrate is more stable than I but was as readily attacked by alkali as I and more so than II. The instability of the nitrates from starch can not, then, be assocd. with the presence of free aldehyde groups. Alkali treatment did not produce a usefully stable nitrate.

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101. Molecular weight and intrinsic viscosity of nitric triesters of corn starches and dextrans

By Caesar, G. V.; Gruenhut, N. S.; Cushing, M. L.

From [Journal of the American Chemical Society \(1947\), 69, 617-21](#). Language: Unavailable, Database: CAPLUS, DOI:10.1021/ja01195a045

The no.-av. mol. wt. (M_n) and intrinsic viscosity (η) of unfractionated nitric triesters of corn starches and corn dextrans were detd. in ethyl acetate solns. The nitric triesters were prepd. under anhyd. conditions and at relatively low temp. The mol. wts. were detd. by a microisopiestic method. The results yielded three linear graphs of $\log M_n$ vs. $\log \eta$, depending on three processes of prepg. the starch. These three lines have a common intersection coincident with the point for maltose octanitrate. The N content could not be made to exceed then triester value; this fact suggests a cyclic structure or an inner anhydride. Data were also obtained for the nitric esters of cellulose, potato amylose, and corn amylose.

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102. Reactions relating to carbohydrates and polysaccharides. LXI. Properties of the fractionated nitrates of two fractions of cornstarch

By Ashford, W. R.; Evans, T. H.; Hibbert, Harold

From [Canadian Journal of Research, Section B: Chemical Sciences \(1946\), 24B, 246-53](#). Language: Unavailable, Database: CAPLUS

By means of preferential adsorption on cellulose (cf. Pacsu and Mullen, C.A. 35, 3843.8) cornstarch was sepd. into amylose (III) and amylopectin (IV). Details of the sepn. and purification of III and IV are given in a flow chart. Each of these purified fractions was nitrated and fractionated by means of alc. (as in Part LX) and the relative stabilities and N contents of the fractions were studied. As judged by the Bergmann-Junk test, the unfractionated nitrate of III had a greater stability than that from IV. The soly. of the former in alc. was only 20.5%, whereas that of the latter was 86.7%. Alc. treatment brought about an increase in stability in the nitrates of both III and IV (in the case of the sol. as well as in the insol. fractions). However, the purified nitrates from III were more stable than those from IV. The properties of the nitrates of the various fractions are in harmony with the branched-chain structure of IV and the linear structure of III. Twenty-four references are given.

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103. Reactions relating to carbohydrates and polysaccharides. LX. Stabilizing action of ethanol on starch nitrates

By Ashford, W. R.; Cooke, L. M.; Hibbert, Harold

From [Canadian Journal of Research, Section B: Chemical Sciences \(1946\), 24B, 238-45](#). Language: Unavailable, Database: CAPLUS

Corn starch nitrate (20 g.) (I) prepd. by Will and Lenze's method (Ber. 31, 68(1898)) was subjected to successive treatments with cold alc., boiling alc., Me₂CO followed by the addn. of alc. and evapn. of the Me₂CO, and finally ether. The wt. of the residue (II) after such treatments was about 15.5 g. The alc.-sol. fractions, which were of low mol. wt. and low in N, were not stabilized by alc. However II showed a much higher Abel stability than did I. II also possessed good explosive properties and contained 13.43 to 13.96% N. Detailed data regarding fractionation, and N content, η_{sp} , Abel stability, and explosive characteristics of the various fractions are included.

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104. Treating antimony drosses

By Jones, Thomas R.

From [No Corporate Source data available \(1946\), US 2401001 19460528](#), Language: Unavailable, Database: CAPLUS

The dross is mixed with a halide, e.g., NH₄Cl, sufficient to convert all metals present to chlorides plus 25% excess, and the mixt. retorted at 500°. The fume, which contains some NH₃, is scrubbed with H₂O whereupon the Sb, together with the other heavy metals present, ppt. as oxides and are recovered by filtration. At this temp. As accompanies the Sb, Sn and Bi oxide, and Zn, Ag, Cu, Fe, Pb, etc., remain in the retort. Two flow-sheets are presented, in which provision is made for recovery and reuse of the NH₄Cl.

~0 Citings

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105. Nitration

By Caesar, Geo. V.

From [No Corporate Source data available \(1946\), US 2400287 19460514](#), Language: Unavailable, Database: CAPLUS

In nitration, water is formed, which dilutes the nitrating mixt. and hinders nitration. If N₂O₅ be used, HNO₃, instead of water, is formed. By nitrating with N₂O₅ in the presence of P₂O₅, the latter reconverts the formed HNO₃ to N₂O₅; $2\text{HONO}_2 + \text{P}_2\text{O}_5 \rightarrow \text{N}_2\text{O}_5 + 2\text{HPO}_3$. A nonaq., inert solvent, such as CHCl₃, CCl₄, PrCl₂, is used. P₂O₅ and HPO₃ are insol. in such solvents. Since water is not present, there is no degradation of the mol. of the substance to be nitrated and no reduction in viscosity. No sulfates, difficult to remove from the nitrated product, are formed. Examples of the nitration of starch, cotton linters, pentaerythritol, toluene, and dimethyloxamide are given.

~3 Citings

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106. Nitration of starches with nitrogen pentoxide in presence of sodium fluoride

By Caesar, G. V.; Goldfrank, Max

From [Journal of the American Chemical Society \(1946\), 68, 372-5](#). Language: Unavailable, Database: CAPLUS, DOI:10.1021/ja01207a007

A lab. app. is described and a detailed method is given for the prepn. of N_2O_5 (mixed with N_2O_4). A simple and effective means of removal of HNO_3 (a by-product in nitrating with N_2O_5) is the use of NaF (which probably forms a H-bonded complex, $NaF \cdot sbd \cdot HONO_2$), by which the efficiency of the nitration reaction is greatly increased. Powd. starch (50 g., previously dried at 105° for 4-5 hrs.) was added to 150-300 g. N_2O_5 in 1500 ml. $CHCl_3$ (previously cooled to about 0°) and the reaction temp. was maintained below $16-18^\circ$. The nitration of corn starch was allowed to proceed for 20 min. and of potato starch for 30-60 min. for complete nitration. The filtered starch trinitrate was washed with 400 ml. $CHCl_3$ and then with hot H_2O , after which it was stabilized in 1 l. hot H_2O by boiling 3 hrs. (with intermediate neutralization in very dil. NH_4OH). The concn. of N_2O_5 had no appreciable effect on the time or degree of nitration; complete nitration was obtained at a ratio of N_2O_5 : starch of 2.5 or higher under a wide variation of time or temp. The degree of nitration can be varied at will, being dependent primarily upon the N_2O_5 :starch ratio. Data are given for the nitration of corn and potato amyloses and amylopectins, heavy-boiling corn and potato starches, thin-boiling corn starch, and dextrans. Because of the completely anhyd. character of the nitration and the relatively low temp. involved, the nitric esters are considered to reflect the degree of polymerization of the original materials and they may offer a new method of structural study of polysaccharide polymers.

~15 Citings

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107. Continuous production and stabilization of nitrates of cellulose or nitrates of other alcohols like starch

By Berl, Ernst

From [No Corporate Source data available \(1945\), US 2384415 19450904](#), Language: Unavailable, Database: CAPLUS

Cellulose can be nitrated in a few sec. or min. to a compd. with 13.95% N by means of HNO_3 , HPO_3 , and P_2O_5 . The HNO_3 , 50-60% of the mixt., is reduced to a few tenths of a % during the nitration. Treatment with alc. or with alc.- C_6H_6 rapidly and efficiently stabilizes the nitrate. Mixed acid contg. $AcOH$ and Ac_2O instead of HPO_3 and P_2O_5 may be used with equally good results; mixed acids composed of HNO_3 , HPO_3 , $AcOH$, and P_2O_5 are also suitable. A continuous sheet of cellulose is led through a bath where it is nitrated, washed, and stabilized at a rate more than 100 times as rapid as with the usual HNO_3 - H_2SO_4 method. Equipment for the production of cellophane may be used for this purpose with only slight modification. The nitrated and stabilized cellulose tissues are particularly suitable as acid-resisting filter cloth and for certain military purposes. Sugar, starch, glycerol, glycol, pentaerythrite, etc., may also be nitrated by this process.

~1 Citing

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108. Solvents, gelatinizers, and plasticizers for cellulose derivatives

By Endres, Rudolf

From [No Corporate Source data available \(1943\), DE 740700 19430909](#), Language: Unavailable, Database: CAPLUS

See Fr. 842,780 (C.A. 34, 5971.9).

~0 Citings

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109. Explosive composition insensitive to blasting cap

By Snelling, Walter O.

From [No Corporate Source data available \(1945\), US 2371000 19450306](#), Language: Unavailable, Database: CAPLUS

Insensitive NH_4NO_3 explosives of the type described in U.S. 1,992,217 (C.A. 29, 2744.9) sometimes fail to detonate completely with the usual booster charge of 1,000 g. of TNT, when used in blasting soft rock formations, such as shale, where the degree of confinement is less than in hard rock. Complete detonation results when the granules of explosive are coated with 0.5 to 3.0% of starch nitrate in the form of powder having dimensions from 0.0005 to 0.002". The explosive so treated is still insensitive to a No. 6 cap. A binding material, such as lacquer, resin, or corn sirup, may be used on the surface of the granules to adhere the starch nitrate.

~0 Citings

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110. Detonating explosives

By Davis, Clyde O.

From [No Corporate Source data available \(1944\)](#), US 2358384 19440919, Language: Unavailable, Database: CAPLUS

A detonating free-flowing explosive capable of withstanding H₂O is prepd. by blending carbonaceous combustibles, an inorg. oxidizing agent preferably NH₄NO₃, although NaNO₃, KNO₃ or perchlorates may also be used, a fibrous carbonaceous material, such as wood pulp not less than 2%, a plant product capable of forming a cohesive paste when mixed with H₂O and an explosive liquid nitric ester, e.g., nitroglycerin not less than 15%. Sample composition of solid ingredients: NH₄NO₃ 74.5, NaNO₃ 10.0, S 2.0, wood pulp 6, a flaked corn product 7 and chalk 0.5%. These or similar ingredients, excepting the corn product, are wheeled with approx. 4% of H₂O. Then the flaked corn product is mixed in, the mix is pressed and dried. The cake is granulated and screened. The fraction through 6 and on 16 mesh having an apparent d. of 1.05-1.35 is mixed with nitroglycerin. The final product contains 20% of nitroglycerin. Other examples are given. The NH₄NO₃ content is at least 50%. Lower strength explosives are obtained by replacing entirely or partly the NH₄NO₃ by NaNO₃. Increased velocity is obtained by raising the nitroglycerin content. U.S. 2,358,385. Clyde O. Davis and Walter C. Holmes (joint inventors; to same assignee). In this compn. the explosive is a solid nitrate of an aliphatic polysaccharide, e.g., **nitrostarch**. A sample compn. is **nitrostarch** 22.0, NH₄NO₃ 58.0, linseed meal 4.5, barley flour 4.5, NaNO₃ 10.0, Al powder 0.5 and chalk 0.5%. This and similar compns. are worked into a free flowing, water-resistant explosive, safe in handling.

~0 Citings

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111. Nitrostarch as a lacquer raw material

By Kraus, Alfred

From [Zeitschrift fuer das Gesamte Schiess- und Sprengstoffwesen \(1943\)](#), 38, 170-1. Language: Unavailable, Database: CAPLUS

cf. C. A. 38, 2224.6. **Nitrostarch** can play the part of a filler addn. agent in lacquers, because it has a certain resinous property. Patents are reviewed.

~1 Citing

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112. Nitrostarch demolition explosives

By Snelling, Walter O.

From [No Corporate Source data available \(1943\)](#), US 2333275 19431102, Language: Unavailable, Database: CAPLUS

There may be used together: **nitrostarch** about 50, Ba(NO₃)₂ about 40, coal dust 3, Al powder 3, substantially dry dicyanodiamide 1, and graphite and paraffin at least 1 part each.

~0 Citings

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113. Nitrostarch as a lacquer raw material

By Kraus, Alfred

From [Zeitschrift fuer das Gesamte Schiess- und Sprengstoffwesen \(1943\)](#), 38, 152-3. Language: Unavailable, Database: CAPLUS

A patent review.

~1 Citing

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114. Stabilizing nitrated carbohydrates such as nitrated starch, sugar or cellulose

By Wyler, Joseph A.; Boyd, Richard N.

From [No Corporate Source data available \(1942\)](#), US 2297734 19421006, Language: Unavailable, Database: CAPLUS

The nitrated carbohydrate is simultaneously brought into contact with an aq. soln. of NaHCO₃ having a pH of 7.1-8.2 and a 0.2% soln. of dicyanodiamide in water, at a temp. of 10-30°.

~2 Citings

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115. Compositions containing nitrostarch and synthetic resins

By Bowlby, Walter D.

From [No Corporate Source data available \(1942\), US 2279439 19420414](#), Language: Unavailable, Database: CAPLUS

relates to lacquers suitable for application to surfaces such as the fingernails, which may contain nitrostarch 3-15, a polyvinyl acetal acetate resin having a low viscosity of 20-200 centipoises 10-25, a plasticizer and a volatile solvent. Such lacquers give films which are free from hairlike strands after application by spraying and subsequent drying.

~1 Citing

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116. Compositions containing nitrostarch and synthetic resins

By Bowlby, Walter D.

From [No Corporate Source data available \(1942\), US 2279438 19420414](#), Language: Unavailable, Database: CAPLUS

A compn. which is suitable for use as a lacquer and which is hardenable by heating in air at a temp. below 120° is formed contg. nitrostarch 10-50 parts together with 90-50 parts of an alkyd resin having an iodine no. of approx. 65 to 135, together with an ester of a polyhydric alc. and a drying oil fat acid, in which the drying oil fat acid represented is in the proportion of about 1-7 equiv. proportions for 3 of the polycarboxylic acid.

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117. Fractionating starch nitrate

By Snelling, Walter O.; Rees, Geo. E.

From [No Corporate Source data available \(1942\), US 2271877 19420203](#), Language: Unavailable, Database: CAPLUS

Starch nitrate is dissolved in part in a solvent mixt. consisting largely of a hydrocarbon diluent such as benzene or toluene and substantially anhyd. MeOH, and the resulting soln. is sepd. from the undissolved material at a temp. of about 50°. By this treatment, a product for making clear lacquers is obtained.

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118. Lacquers containing nitrostarch

By Bowlby, Walter D.

From [No Corporate Source data available \(1941\), US 2261642 19411104](#), Language: Unavailable, Database: CAPLUS

Nitrostarch is used with a substantially nonpolymerizing blown drying oil such as blown perilla oil, the proportion of the nitrostarch being 10-60% of the combined wt. of the nitrostarch and blown oil. Such lacquers dry rapidly to hard, tough films.

~1 Citing

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119. Explosive compositions

No Inventor data available

From [No Corporate Source data available \(1941\), GB 531562 19410107](#), Language: Unavailable, Database: CAPLUS

A dispersion of an imperforate sensitizer is formed in a soln. of NH_4NO_3 or other liquid-ammonia sol. inorg. nitrate in substantially anhyd. liquid NH_3 . The NH_3 is subsequently removed from the resulting mixt. Suitable inorg. sensitizers are Al, Mg, Sb, Zr, ferrosilicon, calcium silicide, S and the like. Among the org. sensitizers there may be mentioned amines such as diphenylamine, hexamethylenetetramine, acid amides, nitro compds., alcs. such as pentaerythritol or polyvinyl alcohol, nitrates such as **nitrostarch** and pentaerythritol tetranitrate and various sugars.

~0 Citings

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120. The preparation and properties of nitrated starch

By Urbanski, T.; Hackel, J.

From [Congr. intern. tech. chim. ind. agr., Compt. rend., Vle congr., Budapest \(1939\), 2, 766-73](#). Language: Unavailable, Database: CAPLUS

Earlier work (cf. C. A. 29, 5657.7; 31, 8927.6) is summarized and new expts. are reported. Starch preps. having different viscosities gave nitrostarches having almost the same viscosities. By fractionating **nitrostarch** from an acetone-water mixt. fractions were obtained which had somewhat different N contents but almost the same viscosities.

~1 Citing

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121. Stabilizing nitrated starch

By Kunz, Alfons

From [No Corporate Source data available \(1940\), DE 691154 19400425](#), Language: Unavailable, Database: CAPLUS

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122. Drying starch

By Horesi, Anthony C.

From [No Corporate Source data available \(1941\), US 2235683 19410318](#), Language: Unavailable, Database: CAPLUS

App. is described, and a process of drying starch in a moist but non-fluent state without substantial gelatinization, which involves subjecting the starch cake to a milling operation and simultaneously subjecting the finely divided starch to contact with a stream of drying gas such as air from a source outside the process which is heated to a temp. above the gelatinizing temp. of the starch instantaneously to remove the major portion of the moisture.

~0 Citings

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123. Nitration of powdered starch

By Kunz, Alfons; Helle, Johann

From [No Corporate Source data available \(1940\), DE 690704 19400411](#), Language: Unavailable, Database: CAPLUS

The powd. starch is mixed with a nitrating mixt. contg. 70-90% HNO_3 at a temp. of 5° . Best results are obtained with a nitrating mixt. consisting of 75-85% HNO_3 and 25-15% H_2SO_4 at a temp. of -5° . A starch acid ratio of 1:4 or 5 will filter easily.

~1 Citing

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124. Combustible composition containing magnesium or an alloy of magnesium

By Takasaki, Yosihiko

From [No Corporate Source data available \(1939\), JP 133222 19391114](#), Language: Unavailable, Database: CAPLUS

A mixt. of Mg or Mg alloy and inorg. salts or org. matter contg. water or moisture, or 1 or more salts contg. water of crystn., is specified. Combustion is accelerated by the O and H from the decompn. of water.

~0 Citings

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125. Apparatus for operations such as washing out acid from nitrated starch

By Helle, Johann; Kunz, Alfons

From [No Corporate Source data available \(1940\), US 2222664 19401126](#), Language: Unavailable, Database: CAPLUS

Various structural and operative details for treating successive batches of material upon a continuous belt system.

~1 Citing

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126. Circulation of liquids of chemical baths such as photographic film-developing baths

By Geyer, Walter

From [No Corporate Source data available \(1940\), US 2222224 19401119](#), Language: Unavailable, Database: CAPLUS

Various details of app. and operation.

~0 Citings

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127. Stabilization of nitrated starch

By Stacho, Oliver

From [No Corporate Source data available \(1940\), HU 123989 19400701](#), Language: Unavailable, Database: CAPLUS

Nitrostarch is treated with capillary-active aliphatic or aromatic org. compds. that contain polybasic mineral acid groups fixed on their carbon chains either directly or through N, O or S atoms. The medium used in the reaction must not dissolve or gelatinize the nitrated starch.

~1 Citing

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128. Stencil sheets

By Snelling, Walter O.

From [No Corporate Source data available \(1940\), US 2191731 19400227](#), Language: Unavailable, Database: CAPLUS

A sheet adapted to be converted into a stencil by the impact of type comprises a fibrous base with a coating contg. **nitrostarch** and a tempering agent such as castor oil (suitably with hydrogenated cottonseed oil, carnauba wax, etc.).

~0 Citings

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129. Electric blasting caps

By Nash, Henry E.

From [No Corporate Source data available \(1940\), US 2186426 19400109](#), Language: Unavailable, Database: CAPLUS

An elec. blasting cap is formed including a shell, a detonating charge, a bridgewire and an igniter charge placed about the bridgewire comprising a finely ground mixt. of diazodinitrophenol and an oxidizing agent such as KClO_3 which does not decompose the diazodinitrophenol, at least the major portion of the mixt. having a particle-size range of about 1-40 microns. U. S. 2,186,427 relates to a generally similar elec. blasting cap in which finely ground diazodinitrophenol is used with a binder such as nitrocellulose or **nitrostarch**.

~0 Citings

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130. Nitrostarch explosives

By Bronstein, Jesse B, Jr.

From [No Corporate Source data available \(1939\)](#), [US 2170629 19390822](#), Language: Unavailable, Database: CAPLUS

Nitrostarch 25-75 is used with nitroisobutylglycerol trinitrate 75-25% in explosives, coating compns., etc.

~0 Citings

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131. Nitrate-containing explosives

By Davis, Clyde O.

From [No Corporate Source data available \(1939\)](#), [US 2168562 19390808](#), Language: Unavailable, Database: CAPLUS

For producing an explosive, a nitrate such as NH_4NO_3 is dissolved in anhyd. liquid NH_3 , a comminuted imperforate sensitizer such as Al, S or dinitrotoluene is dispersed in the soln. thus formed, and free NH_3 is vaporized to leave a solid dispersion product in which the nitrate is a continuous phase. U. S. 2,168,563 relates to prepg. a **nitrostarch** explosive of improved sensitiveness to propagation and decreased sensitiveness to unintentional initiation by dissolving NH_4NO_3 in substantially anhyd. liquid NH_3 , dispersing **nitrostarch** in the soln., and expelling the free NH_3 .

~2 Citings

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132. Stabilization of nitrated starch

No Inventor data available

From [No Corporate Source data available \(1939\)](#), [HU 121180 19390801](#), Language: Unavailable, Database: CAPLUS

Nitrostarch is sepd. of the nitrating acid mixt. and treated in an aq. soln. with 50-90% EtOH, washed with alc. and dried cautiously.

~1 Citing

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133. Actinic-ray-resistant wood lacquer

By White, Arthur H.

From [No Corporate Source data available \(1939\)](#), [US 2143929 19390117](#), Language: Unavailable, Database: CAPLUS

A sprayable, nonbridging, actinic-ray-resistant wood lacquer having a viscosity of less than about 100 centipoises at 25° contains 35-50% of nonvolatile ingredients including **nitrostarch**, from 60% to 120% the wt. of the **nitrostarch** of a resin, and from 22% to 33% the wt. of the **nitrostarch** of a plasticizer (such as dibutyl phthalate) in which **nitrostarch** is sol., together with a solvent mixt. in which at least 50% of the liquids have a b. p. above 100°.

~0 Citings

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134. Lacquer enamel coatings

By Hazen, Richard K.

From [No Corporate Source data available \(1938\)](#), [US 2141911 19381227](#), Language: Unavailable, Database: CAPLUS

A method of forming a hard, dry film on a surface comprises incorporating into an enamel a solvent mixt. and nonvolatile ingredients including pigment, **nitrostarch** and an oil, acid-modified alkyd resin having a softening point ranging from 35° to 66° as detd. by the ring and ball method, the ingredients being present in such proportions that the **nitrostarch** amounts to from 25 to 35% of the wt. of nonvolatile ingredients in the enamel and the resin amounts to from 160 to 180% of the wt. of the **nitrostarch**, the total nonvolatile ingredients in the enamel amounting to at least 40% of its total wt., spraying the resulting enamel onto the surface and baking the sprayed surface at a temp. above 80°. Cf. C. A. 32, 4809.1.

~0 Citings

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135. Nitrostarch demolition explosive

By Young, J. M.

From [Military Engr. \(1939\), 31, 11-14](#). Language: Unavailable, Database: CAPLUS

T. N. T. (I) is the ideal military explosive but, because it is used so extensively for munitions, there is need for a substitute which is suitable for purely demolition purposes. Y. discusses various proposed substitutes (dynamite, NH_4NO_3 -dynamite, tetryl, ammonal, gun cotton, NH_4 picrate ("Explosive D"), blasting gelatin, picric acid (II) and **nitrostarch** (III)), and indicates the disadvantages of each. Blocks of II were tested in comparison with I, but the former were brittle, crumbly and porous. II stains everything with which it comes in contact, making it unsuited for com. purposes. The investigation was then limited to comparative tests between blocks of I and III. The following data were obtained, resp.: hygroscopicity negligible, 1.9%; explosion temp. 870°F., 410°F.; sensitivity to impact (min. height of fall of 2 kg. ball to detonate) 16 in., 8 in.; power 100%, 88%; d. in block form 1.46, 1.78. Accelerated tests indicated that I is more stable than III in long storage although the latter can be stored satisfactorily for a few yrs. About 1900 lb. of III was employed in this investigation and the War Dept. has formally approved its adoption as a substitute standard explosive for use in an emergency. Standard com. packages of I and III are described and illustrated.

~1 Citing

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136. Starch nitrate and acetate

By Dejarme, Noel

From [Revue Generale des Matieres Plastiques \(1938\), 14, 107-8](#). Language: Unavailable, Database: CAPLUS

A brief patent review.

~1 Citing

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137. Removing acid from nitrated starch

By Helle, Johann; Kunz, Alfons

From [No Corporate Source data available \(1938\), US 2127360 19380816](#), Language: Unavailable, Database: CAPLUS

A process is described for the removal of nitrating acid from nitrated starch by displacement of the acid with water, which consists in drawing the water successively through a series of batches of the nitrated starch on filters wherein the liquid drawn through the last filter of the series is passed into the next preceding filter and so on, until the acid removed from the successively filtered batches of the series is drawn through a filter containing fresh nitrated starch, the water-washed nitrated starch being withdrawn from that end of the series where the fresh water enters while the filter thus cleared before being charged again with nitrated starch is freed from water. App. is described.

~2 Citings

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138. Electric blasting squib

By Burrows, Lawton A.; Noddin, Geo. A.

From [No Corporate Source data available \(1938\), US 2123691 19380712](#), Language: Unavailable, Database: CAPLUS

A nonviolent, ventless elec. blasting squib comprises a rigid shell contg. a base charge, such as Mg and BaO₂, capable of generating sufficient heat to fuse a vent in the shell, a juxtaposed charge such as BaO₂, Se and nitrostarch capable of igniting the base charge, and elec. connections for firing the juxtaposed charge, both of the charges being incapable, upon combustion, of generating sufficient gas pressure within the shell to burst it or forcibly to eject the base charge in ignited condition through a fused vent in the shell.

~0 Citings

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139. Drying nitrostarch

No Inventor data available

From [No Corporate Source data available \(1938\), HU 118215 19380615](#), Language: Unavailable, Database: CAPLUS

Water-contg. nitrostarch is pressed in vacuo to remove most of the water, then disintegrated and dried by an air current.

~0 Citings

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140. Lacquer

By Bowlby, Walter D.

From [No Corporate Source data available \(1938\), US 2120236 19380614](#), Language: Unavailable, Database: CAPLUS

A lacquer which upon drying gives a film that is substantially proof against discoloration by actinic rays is formed from a nitrostarch having a viscosity characteristic of 4 to 6 centipoises and a N content of 11.5-12.5%, used with a plasticizer mixt. consisting of about 2 parts of a substantially liquid plasticizer such as di-Bu triacetate and about 5 parts of a plasticizer which is at least semisolid at room temps. such as glycol sebacate (the total plasticizers being 40-60% the wt. of the nitrostarch). Various examples are given.

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141. Removing acid from nitrated starch

No Inventor data available

From [No Corporate Source data available \(1938\), HU 118103 19380516](#), Language: Unavailable, Database: CAPLUS

Starch nitrated according to the preceding abstr. is washed with water in countercurrent. Technical details are given.

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142. Nitration of starch

No Inventor data available

From [No Corporate Source data available \(1938\), HU 118102 19380516](#), Language: Unavailable, Database: CAPLUS

Starch powder is treated with 4-6 parts by wt. of an acid mixt. contg. 75-85% HNO₃ and 25-15% H₂SO₄ at a temp. below 5° with continuous mixing. The product is continuously led off and a subsequent nitration takes place in a cooled space. Cf. C. A. 32, 3964.4.

~1 Citing

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143. Fusee

By Sherman, Louie A.

From [No Corporate Source data available \(1938\), US 2120580 19380614](#), Language: Unavailable, Database: CAPLUS

A shell contains a plurality of preformed combustible units each constructed to burn approx. throughout a predetd. period of time.

~0 Citings

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144. Blasting explosive

By Nice, Milo A.

From [No Corporate Source data available \(1938\), US 2120503 19380614](#), Language: Unavailable, Database: CAPLUS

A nongelatinous explosive contg. an explosive liquid nitric ester such as nitroglycerin together with nitrocellulose, NH_4NO_3 and a nondetonating absorbent such as wood pulp, flour, etc., has a d. corresponding to about 90 to 100 1.25-in. by 8-in. cartridges per 50 lb. (the NH_4NO_3 constituting about 26-46% and the liquid nitric ester about 22-28% of the explosive).

~0 Citings

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145. Ignition compositions suitable for use in electric blasting initiators

By Filbert, Wm. F.; Lawson, Walter E.

From [No Corporate Source data available \(1938\), US 2118501 19380524](#), Language: Unavailable, Database: CAPLUS

A Pb salt of the nitrated product of diphenylol propane is used (suitably with KClO_3 or with Zr and **nitrostarch**). Cf. C. A. 32, 2357.5.

~0 Citings

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146. Lacquer enamel

By Hazen, Richard K.

From [No Corporate Source data available \(1938\), US 2115020 19380426](#), Language: Unavailable, Database: CAPLUS

A lacquer enamel having a viscosity of 60-110 centipoises at 25° and drying at atm. temps. to form a durable film contains a solvent mixt. such as EtOH, EtOAc, BuOH, BuOAc and toluene, together with a pigment, **nitrostarch** and resin, the **nitrostarch** being 40-55% of the nonvolatile ingredients, and the sum of resins, plasticizers and softeners being 70-110% the wt. of the **nitrostarch**, and the wt. of the nonvolatile ingredients being 30-55% of the total wt. of the lacquer enamel.

~0 Citings

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147. Electric squib

By Hoddin, Geo. A.

From [No Corporate Source data available \(1938\), US 2112974 19380405](#), Language: Unavailable, Database: CAPLUS

A ventless rigid shell is used with a deflagrating base charge and a localized shell-opening charge of a detonating explosive compn. such as Pb azide and **nitrostarch** juxtaposed against the inner surface of the shell at a locus vicinal to the region where the base charge is contained.

~1 Citing

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148. Nitrating starch

By Helle, Johann; Kunz, Alfons

From [No Corporate Source data available \(1938\), US 2112989 19380405](#), Language: Unavailable, Database: CAPLUS

Dry powd. starch is mixed with a nitrating acid contg. 70-90% HNO_3 , and during the mixing and subsequent reaction the temp. of the materials is maintained below 5° . App. is described. Such regulation of the process serves to produce a product easily sepd. from spent acid and easily stabilized.

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149. Lacquer-coated flexible sheets

By Bowlby, Walter D.

From [No Corporate Source data available \(1938\), US 2106164 19380125](#), Language: Unavailable, Database: CAPLUS

Sheets such as those of paper, cardboard or rubber are coated with an adherent flexible lacquer film contg. **nitrostarch** together with at least 20% as much of a plasticizer such as dibutyl phthalate. Cf. C. A. 32, 2254.8.

~0 Citings

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150. Composition containing **nitrostarch** and nitrated sucrose

By Wyler, Joseph A.

From [No Corporate Source data available \(1938\), US 2105389 19380111](#), Language: Unavailable, Database: CAPLUS

A light, fluffy, pulverulent compn. suitable for use as an explosive comprises a solid soln. of **nitrostarch** at least 8.4% in a predominating amount of nitrated sucrose.

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151. Nitration of cellulose and starch by means of nitric anhydride

By Urbanski, T.; Janiszewski, Z.

From [Roczniki Chemii \(1937\), 17, 349-52\(in French 352\)](#). Language: Unavailable, Database: CAPLUS

The authors have examd. the nitrating action of N_2O_5 on cellulose and starch. By the action of N_2O_5 , it is possible to obtain nitrocellulose contg. about 14% of N. The same result is obtained when liquid N_2O_5 mixed with HNO_3 acts on cellulose. Starch nitrated with gaseous or liquid N_2O_5 contains up to 13.85% of N.

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152. Use of safety dynamites in atmospheres containing methane

By Audibert, Etienne; Cheradame, Raymond

From [Revue de l'Industrie Minerale \(1937\), No. 399, 403-35](#). Language: Unavailable, Database: CAPLUS

cf. C. A. 30, 8619.9. The conditions for the safe use of explosives in air contg. CH_4 are formulated. Although mixts. of nitroglycerin, NH_4NO_3 and NaCl are safe but inefficient explosives, mixts. of nitroglycerin, NH_4NO_3 , cellulose and a solid which liberates inert gases on heating ($\text{MgSO}_4 \cdot 7\text{H}_2\text{O}$, $\text{Na}_2\text{HPO}_4 \cdot 12\text{H}_2\text{O}$, NH_4Cl) are both safe and efficient.

~0 Citings

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153. Nitrated hydroxy esters of pentaerythritol

By Wyler, Joseph A.

From [No Corporate Source data available \(1937\), US 2086146 19370706](#), Language: Unavailable, Database: CAPLUS

Reaction products of pentaerythritol or dipentaerythritol with lactic, glycolic, hydroxybutyric or tartaric acid are nitrated, forming nitration products suitable for use in explosives or as solvents or plasticizers with **nitrostarch** or nitrocellulose, etc. Various details are given, and a catalyst such as $Al_2(SO_4)_3$ may be used in forming an ester such as a pentaerythritol lactate which is to be nitrated.

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154. Coating compositions (varnishes, lacquers or the like)

By Bent, Leavitt N.

From [No Corporate Source data available \(1937\)](#), US 2066759 19370105, Language: Unavailable, Database: CAPLUS

Pentaerythrite abietate is used with a drying oil such as linseed oil or with a nitrated carbohydrate such as nitrocellulose or **nitrostarch**, suitably also with various auxiliary ingredients such as PbO, Pb linoleate, solvents, diluents, etc.

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155. Granular detonating explosive

By Crater, Willard de C.

From [No Corporate Source data available \(1936\)](#), US 2055403 19360922, Language: Unavailable, Database: CAPLUS

A free-flowing explosive is prepd. by forming a gel contg. a cryst. explosive salt in soln. such as NH_4NO_3 together with a noncryst. nitrated carbohydrate such as nitrocellulose or **nitrostarch** and drying the gel.

~0 Citings

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156. Nitrostarch

By Centola, Germano

From [Gazzetta Chimica Italiana \(1936\)](#), 66, 8-15. Language: Unavailable, Database: CAPLUS

Rice starch, nitrated with HNO_3 of various concns., gave a series of products contg. 8.5-12.4% N. X-ray examn. showed that the **nitrostarch** with 12.4% N had a fairly regular structure, and both the positions and intensities of the interference lines resembled those of unstable nitrocellulose contg. 12% N, so that the 2 substances probably have the same structure. With diminution in the N content, the diffraction lines become more uncertain, so that the degree of crystn. becomes more imperfect with decrease in the NO_2 groups. These esters are constituted of starch mols. with their OH groups incompletely esterified, not of mixts. of unaltered starch mols. and completely esterified mols. This was confirmed by inability to fractionate the mixts. with any solvents. Eight samples of rice starch were immersed in a $\text{HNO}_3\text{-H}_2\text{SO}_4\text{-H}_2\text{O}$ (41:56:3) mixt. at 20° for differing times (3-200 min.). After washing with water and 70% EtOH, the products contained 11.0-13.3% N. They all gave diffraction spectra of **nitrostarch**, even those of the shortest times, where unaltered starch was recovered. A comparison of the results with analogous expts. with cellulose (cf. Hess and Trogus, C. A. 26, 1772) shows that starch reacts more rapidly, and the lattice of **nitrostarch** is evident immediately by x-rays. Since the velocity of the esterification reaction may be assumed to be the same for the OH groups of starch and of cellulose, the difference in behavior is attributable to the fact that the velocity of penetration of the nitrating mixts. into the starch micelles is much greater. The x-ray spectrum of **nitrostarch** by this method is identical with that of the product from HNO_3 , and for the same N content is a little sharper. Though **nitrostarch** prepd. from HNO_3 gives clear solns. in MeOH, that prepd. from $\text{HNO}_3\text{-H}_2\text{SO}_4\text{-H}_2\text{O}$ mixts. was found to be only partially sol., and filtration of the insol. portion and pptn. of the sol. portion with water gave 2 fractions with the same x-ray diagram. That sol. in MeOH is termed nitromylose, because sapon. by the method of Damansky (C. A. 29, 2381.8) yields amylose; that insol. in MeOH is termed nitroamylopectin, because sapon. gives amylopectin. **Nitrostarch** contg. 12.45% N gave a nitroamylose contg. 12.50% N and a nitroamylopectin contg. 12.34% N. This behavior is in harmony with the fact that nitration of amylose gives nitroamylose identical to that obtained from the MeOH-sol. portion of the **nitrostarch** and from **nitrostarch** prepd. from HNO_3 alone. This explains why **nitrostarch** prepd. from HNO_3 is sol. in MeOH, and gives a less sharp x-ray diagram than does that prepd. from $\text{HNO}_3\text{-H}_2\text{SO}_4\text{-H}_2\text{O}$. The differences between the 2 fractions of **nitrostarch** are the same as those between amylose and amylopectin, i. e., a different degree of polymerization and crystn. (cf. Meyer, Hopff and Mark, C. A. 23, 4451). Potato starch and bean starch gave **nitrostarch** with the same properties as that from rice, so that structural differences in various types of starch (cf. Samec and Katz, Z. ges. Schiess-Sprengstoffw. 163, 291(1933)) disappear in the transformation into **nitrostarch**. This is in contrast with the structural differences in the products from natural cellulose and mercerized cellulose. The polymorphism of starch is therefore different from that of cellulose. Probably the polymorphism of starch can be explained by the manner in which the H_2O of crystn. is bound; that of starch by differing arrangements of the chain mols. in the micelle. This represents a fundamental difference between starch and cellulose.

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157. Acetoneglyceraldehyde. III. Synthesis of d-fructose and d-sorbose from d-glyceraldehyde or from d-glyceraldehyde and dihydroxyacetone

By Fischer, Hermann O. L.; Baer, Erich

From [Helvetica Chimica Acta \(1936\)](#), 19, 519-32. Language: Unavailable, Database: CAPLUS

cf. C. A. 28, 4702.4. d-Glyceraldehyde (I), prepd. from 1,2,5,6-diacetonemannitol treated with $\text{Ba}(\text{OH})_2$ and then H_2SO_4 , gave a mixt. of hexoses from which d-fructose (II) and d-sorbose (III) were isolated. The sepn. of the 2 isomers is described. A mixt. of I and dihydroxyacetone (IV) treated as above gave II and III. It would appear that I is converted to IV and then I and IV react to give II and III. The crystal structures of synthetic II and III are given.

~4 Citings

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158. Highly polymerized compounds. CXXXVI. The structure of starch

By Staudinger, H.; Eilers, H.

From [Berichte der Deutschen Chemischen Gesellschaft \[Abteilung\] B: Abhandlungen \(1936\)](#), 69B, 819-48. Language: Unavailable, Database: CAPLUS

cf. C. A. 4068.7. A pure, ash-free hemicolloidal starch can be obtained by treating potato starch with acids, and the mol. wt. can be varied between 10,000 and 100,000 by varying the conditions. These polymeric homologs can be pptd. fractionally by adding MeOH, which first ppts. a glutinous, high-ash material, then a much purer product. Viscosities in HCOOH, water, HCONH₂ and NaOH at 20°, 60° and after cooling again to 20° were detd. on hemicolloidal starches produced with 2 N HCl and with concd. HCOOH; viscosities were also detd. in the same solvents at 20° on hemicolloidal starch produced by diastase. The viscosities before and after acetylation and before and after sapon. with MeOH show that chem. change can take place without changing the size or structure of the particles, which can be explained only on the basis of a macromol. structure. Starch acetate has a higher viscosity than starch in HCOOH, because it is more highly solvated. The viscosity of starch acetate was detd. in CHCl₃, dioxane, C₂H₄Br₂, HCOOH and Me₂CO at different temps. and concns. Mol. wts. of starch and starch acetates were detd. cryoscopically in C₂H₄Br₂ and in dioxane and were much lower than those calcd. from the viscosity measurements. Some starch fractions were nitrated and the viscosities, detd. in Me₂CO soln., were much less than solns. of the same concn. of the same starches in HCOOH. The nitrates of the starches of high mol. wt. had a lower mol. wt. than the nitrates of the starches of low mol. wt., and increasing the duration of nitration did not affect the viscosity; the destruction of the glucoside linkage of the starch mol. must therefore take place before nitration. The α-glucosidal linkage of starch is broken down more easily than the β-linkage of cellulose. Viscosity measurements on starch nitrate at different temps. showed that it is similar to cellulose nitrate.

~0 Citings

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159. Starch nitrates (so-called **nitrostarch**)

By Matla, W. P. M.

From [Chemisch Weekblad \(1936\)](#), 33, 120-5. Language: Unavailable, Database: CAPLUS

A review with 76 references.

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160. Starch nitrate

By Berl, E.; Kunze, W. C.

From [Justus Liebig's Annalen der Chemie \(1935\)](#), 520, 270-89. Language: Unavailable, Database: CAPLUS

Starch (I) is nitrated with HNO₃/H₃PO₄ mixts. giving a starch nitrate (II) with a max. N content of 13.0% as against 14.14% for trinitrate. The viscosity of II shows a flat max. after 12 hrs. of nitration. Decreasing the H₂O content of the mixed acids decreases the stability of II without increasing its percentage of N. With 6% or more H₂O in the acid, the product does not deflagrate below 180°; H₂O, MeOH and particularly AcOH act as stabilizers. The potato starch used shows by x-rays about 9 interference rings. This no. is reduced to 3 by nitration, and raised again but not quite up to the original no., when II is converted into sol. I by sapon. Under the microscope, II shows a transparent shell, surrounding an opaque center. By freezing the moistened II, suspending in water and fractionating by settling, 2 products are obtained contg. 11.6 and 12.1% N, resp. Treated with Me₂CO, the outer shell swells, while the inner material gives a clear soln. This proves the presence of 2 different materials, amylose nitrate and amylopectin nitrate. As with cellulose nitrate, the use of H₃PO₄ gives a product which is less broken down, and thus shows a higher viscosity (about 10 fold) than when H₂SO₄ is used. The viscosity is also a function of the origin of I, of the strength of acid used in nitration and of the time and temp. of nitration. Sep. nitration of amylose and amylopectin show higher N content and much lower viscosity in the case of the latter. Preheating of I in autoclave up to 180° progressively decreases the viscosity of II.

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161. Net density of starch

By Takei, Bunsuke

From [Memoirs of the College of Science, Kyoto Imperial University \(1935\)](#), A18, 169-72. Language: Unavailable, Database: CAPLUS

cf. Yoshida and Takei, C. A. 26, 3916. Purified starch reaches a const. compn. and d. after 5 hrs. pumping with an oil pump at 70-90°. The net ds. of rice and potato starches after this treatment are 1.646 and 1.650, resp., considerably higher than previous values.

~0 Citings

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162. X-ray studies of nitrated starches. I

By Kolaczowska, Marja; Urbanski, Tadeusz

From [Roczniki Chemii \(1935\), 15, 339-42](#). Language: Unavailable, Database: CAPLUS

The authors obtained x-ray spectrograms of nitrated potato and sol. starch by the Debye-Scherrer method. Both show a marked resemblance and give the same principal interference rings. Natural starch is more cryst. before the introduction of .sbd.ONO₂ groups, while the structure of sol. starch changes regularly during nitration.

~0 Citings

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163. Microscopy of starches and their modifications

By Sjostrom, Otto A.

From [Industrial and Engineering Chemistry \(1936\), 28, 63-74](#). Language: Unavailable, Database: CAPLUS, DOI:10.1021/ie50313a018

A series of photomicrographs shows the appearance of the more important starches and their modifications, also the thin-boiling starches and dextrans, in their gelatinized and disintegrated forms. These pictures support the recent theory of "growth structure."

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164. The use of **nitrostarch** in the production of powder and explosives

By Fishbein, M. S.

From [Voennaya Khim. \(1933\), \(No. 4\), 12-14](#). Language: Unavailable, Database: CAPLUS

A review of patents.

~0 Citings

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165. Igniter powder

By Pickett, Oscar A.

From [No Corporate Source data available \(1935\), US 2008366 19350716](#), Language: Unavailable, Database: CAPLUS

A thermally fired igniter charge for a detonator cap contains Zr (which may be used together with KClO₃ and gum arabic or **nitrostarch**, etc.).

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166. Coating for explosives

By Johnson, Norman G.; Lewis, Harold A.

From [No Corporate Source data available \(1935\), CA 351025 19350618](#), Language: Unavailable, Database: CAPLUS

A high explosive free from toxic effects, and satisfactorily sensitive to detonation and propagation of the explosive wave is obtained when a dynamite compn. contains one or more ingredients coated with pentaerythritol tetranitrate. Three examples are: **nitrostarch** -, -, 15.0; NH₄NO₃, coated with pentaerythritol tetranitrate 100.0, 75.0, 64.0; pentaerythritol tetranitrate -, 25.0, -; NaNO₃ -, -, 20.2; engine oil -, -, 0.3; CaCO₃ -, -, 0.5. Cf. C. A. 28, 7018.2.

~0 Citings

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167. Preparation and properties of the nitric acid ester of starch. III. Explosive properties

By Hackel, J.; Urbanski, T.

From [Zeitschrift fuer das Gesamte Schiess- und Sprengstoffwesen \(1935\)](#), 30, 98-101. Language: Unavailable, Database: CAPLUS

cf. C. A. 28, 1865.5. Twelve samples of nitro- starch varying in percentage of N from 13.43 to 6.49 were prepd. from potato starch (C. A. 28, 1865.5.) and tests made to det. the rate of detonation, Pb block expansion, Cu cylinder compression and sensitiveness. These were in direct relation to N content. Samples with less than 9% N were too weak to be classed as explosives; those with mean to high N content rank with explosives such as TNT and picric acid as regards explosive properties.

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168. The nitration of starch

By Grard, Jean

From [Compt. rend. \(1935\)](#), 200, 410-11. Language: Unavailable, Database: CAPLUS

Starch moistened with 35% its wt. of H₂O and heated in an autoclave at 150° for 15 min. gave a plastic mass which could be squeezed through a die with a 0.2-mm. opening into long fine threads. These threads of starch hardened on exposure to the air or washing with EtOH. After drying, these threads were easily powd. and nitrated with 25 parts HNO₃, 65 parts H₂SO₄ and 10 parts H₂O.

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169. Explosives suitable for use in blasting

By Wyler, Joseph A.

From [No Corporate Source data available \(1935\)](#), US 1985968 19350101, Language: Unavailable, Database: CAPLUS

Tetranitromethane and mononitroxylene are used with NH₄NO₃, NaNO₃, [nitrostarch](#), nitrocellulose, TNT, Al, ZnO, corn meal, etc.

~0 Citings

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170. Preparation and properties of the nitric acid ester of starch. II

By Hackel, J.; Urbanski, T.

From [Zeitschrift fuer das Gesamte Schiess- und Sprengstoffwesen \(1934\)](#), 29, 16-17. Language: Unavailable, Database: CAPLUS

See C. A. 27, 3334.

~0 Citings

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171. Preparation and properties of the nitric acid ester of starch. I

By Hackel, J.; Urbanski, T.

From [Zeitschrift fuer das Gesamte Schiess- und Sprengstoffwesen \(1934\)](#), 29, 14-16. Language: Unavailable, Database: CAPLUS

See C. A. 27, 2302.

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172. Preparation and properties of the nitric acid ester of starch. I

By Hackel, J.; Urbanski, T.

From [Zeitschrift fuer das Gesamte Schiess- und Sprengstoffwesen \(1933\)](#), 28, 306-10,350-4,378-82. Language: Unavailable, Database: CAPLUS

See C. A. 27, 2302.

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173. Nitrostarch

By Norman, Geo. M.

From [No Corporate Source data available \(1933\)](#), US 1908857 19330516, Language: Unavailable, Database: CAPLUS

Porous starch flakes are subjected to the action of a mixt. of HNO_3 and H_2SO_4 for producing explosive nitrated porous flakes.

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174. The effect of the crimped-paper ends on cartridges of permissible explosives in propagating detonation

By Gawthrop, D. B.

From [Rept. of Investigation \(1932\)](#), 3191, 7 pp.. Language: Unavailable, Database: CAPLUS

The av. distance which detonation is propagated over an air gap between cartridges of a permissible explosive is 31% less when a crimped end faces a crimped end than when a cut end faces a cut end. A crimped-end initiator of permissible explosive propagates detonation to a cut-end receiver of 40% straight dynamite over an av. distance 3% < a similar cut-end initiator. A crimped-end receiver of permissible explosive is sensitive to detonation brought about by a cut-end initiator of 40% straight dynamite over an av. distance 24% < a similar cut-end receiver. An initiator of 40% straight dynamite propagates detonation to a cut-end cartridge of permissible explosive over an av. distance 90% > a cut-end initiator of permissible explosive. A cut-end receiver of 40% straight dynamite is sensitive to detonation brought about by a cut-end initiator of permissible explosive over a distance 160% > a cut-end receiver of permissible explosive. The distance over which detonation is propagated in the halved-cartridge gap test is decreased to a greater extent by the use of a crimped-end receiver than by the use of a crimped-end initiator. There is no apparent relation to the chem. compn. or to the phys. properties of the explosive.

~0 Citings

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175. Oxidation of carbonyl sulfide

By Thompson, H. W.; Hovde, F. L.; Cairns, A. C. H.

From [Journal of the Chemical Society \(1933\)](#), 208-16. Language: Unavailable, Database: CAPLUS, DOI:10.1039/jr9330000208

cf. preceding abstr. The critical explosion limits were studied. No slow reaction was observed. An induction period of variable length precedes the explosion of mixts. of O and COS. The lower pressure limit for explosion decreases with increasing temp. Decrease in the dimensions of the reaction vessel raises the lower limit. The lower limit is depressed by addn. of inert gases, except SO_2 and CO_2 which raise the limit. The upper limit is somewhat indefinite. The possible reaction chains are discussed.

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176. Lacquers containing nitrocellulose and nitrostarch

By Lams, Wm. R.; Wyler, Joseph A.

From [No Corporate Source data available \(1931\)](#), US 1833526 19311124, Language: Unavailable, Database: CAPLUS

Nitrocellulose and **nitrostarch** are used together with alkali metal palmitates, Na formate, aniline-HCl, aniline acetate or p-aminoacetanilide, which serve as homogenizers or blending agents.

~0 Citings

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177. Stabilizing **nitrostarch**

By Snelling, Walter O.; Wyler, Joseph A.

From [No Corporate Source data available \(1931\)](#), US 1835911 19311208, Language: Unavailable, Database: CAPLUS

Nitrostarch is treated with pyridine of low concn. (suitably in a 0.1% aq. soln.) simultaneously with another neutralizing agent such as NH_3 and MeNH_2 .

~0 Citings

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178. Propellant explosive

By Snelling, Walter O.

From [No Corporate Source data available \(1931\)](#), US 1808613 19310602, Language: Unavailable, Database: CAPLUS

Grains are formed by compressing **nitrostarch** granules rendered smokeless and flashless by admixt. with guanidine nitrate, NH_4NO_3 , urea nitrate or nitroguanidine and superficially colloided.

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179. **Nitrostarch**

By Pickett, Oscar A.

From [No Corporate Source data available \(1930\)](#), US 1779825 19301028, Language: Unavailable, Database: CAPLUS

A nitrated starch of relatively low viscosity and a high degree of soly. and stabilization is prepd. by the simultaneous swelling and nitration of starch of normal d.

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180. **Nitrostarch**

By Schrimppff, August

From [Zeitschrift fuer das Gesamte Schiess- und Sprengstoffwesen \(1930\)](#), 25, 273-8. Language: Unavailable, Database: CAPLUS

S. gives a partial review of the literature of **nitrostarch**, chiefly with reference to its use in com. and military explosives in the U. S. He calls attention to the fact that German transportation regulations class explosives of this type with chlorate explosives in reference to safety in handling. **Nitrostarch** explosives are not manufd. in Germany.

~0 Citings

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181. A modification of the molecular weight method of Barger

By Berl, E.; Hefter, O.; Rau, F.; Djang, G. S.; Umstatter

From [Justus Liebig's Annalen der Chemie \(1930\)](#), 478, 235-46. Language: Unavailable, Database: CAPLUS

The method used by Barger for detg. mol. wts. was modified by using a capillary U-tube with a tube sealed into it at the bend. This side arm allows air to escape when the app. is being filled. After the solns. to be used are placed in the tubes, they are sealed off. Readings of the menisci are taken over a period of about 3 weeks. It is possible to interpolate the concn. at which no distn. takes place by using solns. of different concns. With acetone-azobenzene solns. the av. error was about 2%. Results are given for several org. compds. such as bromocamphor, dinitrophenylamine and benzoic acid. A discussion of the mol. wts. of several carbohydrate nitrates is given. Cellobiose and maltose nitrates give normal mol. wts. Raffinose nitrate shows a partial, and sucrose nitrate an almost complete inversion to monosaccharide. Nitrated starch gives a value corresponding to 6-7 C₆H₁₀O₅. Values are given for oils such as paraffin oil, machine oil, etc.

~1 Citings

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182. Nitrating of starch or other materials

By Skoglund, Jean V.

From [No Corporate Source data available \(1930\), US 1751367 19300318](#), Language: Unavailable, Database: CAPLUS

In order to free the nitrate products from mixed acids, substantially all the free mixed acid is displaced by a mineral acid, such as H₂SO₄, of substantially the same sp. gr. recoverable in concd. form after diln. by evapn. of the water content; the material is drowned with water. An app. is described.

~0 Citings

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183. Explosives containing nitrated sugar

By Wrightsman, Philip G.

From [No Corporate Source data available \(1930\), US 1751377 19300318](#), Language: Unavailable, Database: CAPLUS

A suspension of 25-50% of sugar in a chlorohydrin-contg. mixt. (which also may contain glycol or glycerol, etc.) or less viscosity than glycerol is nitrated to obtain a product which is suitable for making explosives of the dynamite type.

~0 Citings

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184. Artificial solidified fuel mixture comprising alcohol and **nitrostarch**

By Wyler, Joseph A.

From [No Corporate Source data available \(1930\), US 1752935 19300401](#), Language: Unavailable, Database: CAPLUS

~0 Citings

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185. Sensitization of ammonium nitrates by **nitrostarch**

By Perrott, G. St. J.; Gawthrop, D. B.; Taylor, C. W.

From [Bur. Mines Repts. Investigations \(1930\), No. 2987, 7 pp.](#), Language: Unavailable, Database: CAPLUS

The addn. of **nitrostarch** to NH₄NO₃ in quantities of 1% and higher increases the sensitivity to explosion at elevated temps. under confinement and increases the completeness and speed of detonation when the mixt. is detonated by a tetryl booster.

~0 Citings

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186. Explosive

By Rupp, Guy A.

From [No Corporate Source data available \(1929\), US 1728307 19290917](#), Language: Unavailable, Database: CAPLUS

In forming an explosive which is non-dusting, a nitric ester of a carbohydrate such as **nitrostarch** is suspended in water, and a water-immiscible liquid such as a lubricating oil is stirred with the aq. slurry until absorbed by the carbohydrate ester.

~0 Citings

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187. Explosive containing ammonium nitrate and hexamethylenetetramine

By Wyler, Joseph A.

From [No Corporate Source data available \(1929\), US 1720459 19290709](#), Language: Unavailable, Database: CAPLUS

An explosive which is readily detonated comprises NH_4NO_3 76-96 and $(\text{CH}_2)_6\text{N}_4$ 4 parts, with or without **nitrostarch**, NaNO_3 , ZnO , hydrocarbon oil, etc.

~1 Citing

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188. Explosive

By Snelling, W. O.; Rupp, G. A.

From [No Corporate Source data available \(1928\), US 1659449 19280214](#), Language: Unavailable, Database: CAPLUS

An explosive is formed from **nitrostarch** 5-20%, ferro-Si 1-4%, NH_4NO_3 and carbonaceous material such as corn meal, with or without other ingredients.

~0 Citings

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189. Transporting and handling **nitrostarch** or other pulverulent materials

By Snelling, W. O.; Rupp, G. A.

From [No Corporate Source data available \(1927\), US 1652960 19271213](#), Language: Unavailable, Database: CAPLUS

Nitrostarch or other pulverulent material in the form of a slurry is introduced into a tank, permitted to settle and subjected to vibration to promote settling; supernatant liquid is removed, the remaining material is transported in the tank, and, when it is desired to remove it from the tank, liquid is added again to form a fluent slurry which flows from the tank.

~2 Citings

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190. **Nitrostarch**

By Okada, Hajime

From [Seniso Kogyo \(1927\), 3, 3-14](#). Language: Unavailable, Database: CAPLUS

The methods of nitration of starch, the stabilization, the denitration, the swelling of **nitrostarch** and sulfuric acid ester contained in **nitrostarch** have been investigated. By either the direct nitration of starch with mixed acid or the indirect method newly discovered by O., which consists of preliminary treatment of starch with a certain medium before bringing to the ordinary nitration, **nitrostarch** contg. 13% of the NO_2 group can be obtained, and during both nitrations the starch undergoes no more damage caused by the action of hydrolysis or oxidation of mixed acid than cotton cellulose undergoes. The stabilization of **nitrostarch** is easily made by means of washing with hot alc. contg. a little water or acetone, and the denitration also may be carried out with a very dil. soln. of NH_4HS ; the denitrated starch is freed from S by treatment with H_2O_2 , hot alc. and hot acetone. Alc., acetone-water mixt. and acetone-alc. mixt. swell the **nitrostarch**; of these the acetone-water mixt. is the best. The amt. of sulfuric acid ester in **nitrostarch** is not more than that in nitrocotton.

~1 Citing

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191. Explosive for mining coal

By Snelling, W. O.

From [No Corporate Source data available \(1927\)](#), US 1631070 19270531, Language: Unavailable, Database: CAPLUS

Hydrocellulose is used with a detonating substance such as **nitrostarch** and other substances such as NH_4NO_2 , nitroglycerin, TNT, NaNO_3 , ZnO, mineral oil, wood pulp, NaCl and CaCO_3 . Cf. C. A. 20, 2751.

~1 Citing

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192. Sensitiveness of explosives and sensitiveness tests

By La Motte, Arthur

From [Du Pont Explosives Service Bulletin \(1927\)](#), 3 pages. Language: Unavailable, Database: CAPLUS

This is a discussion of the "gap test" in which a cartridge of explosive is cut in half longitudinally, a detonator inserted in the closed end of one piece, the two halves, with their cut ends facing one another, are placed at a carefully measured distance apart, rolled up in a sheet of Manila paper and the system is placed on the firing ground and detonated. By tentative procedure the greatest distance at which the second half of the cartridge is detonated under the influence of the detonation of the first half is detd. This test is useful only in detg. the change in sensitiveness a given explosive undergoes with exposure and time, but not in distinguishing between explosives, the differences shown by. different types being very much greater than that produced by "deterioration", in a given explosive. Thus in this test the "gap" for a 60% straight dynamite may be over 48 in., with a 20% explosive gelatin 4 in.; while with a **nitrostarch** powder which, under confinement, propagates detonation indefinitely. the gap is usually 1-2 in. Moreover certain explosives whose detonation may be initiated by 1-2 grain of $\text{Hg}(\text{ONC})_2$ give no gap, while another explosive which requires 4-5 times as much $\text{Hg}(\text{ONC})_2$ to initiate its detonation will give a gap of several in. This test should be made under standard conditions as follows: the explosive to be in 1.5 in. cartridges; the two halves to be wrapped in 3 turns of paper similar to the lining paper in dynamite cases; the test should be made at a temp. of 70°F., for the sensitiveness of any nitroglycerin explosives to explosion by influence falls off to an appreciable extent at temps. lower than 70°F. but does not materially increase at temps. above this within reasonable limits.

~0 Citings

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193. Safety explosive

No Inventor data available

From [No Corporate Source data available \(1926\)](#), SE 60901 19260602, Language: Unavailable, Database: CAPLUS

A mixt. of NH_4NO_3 , Fe-Si, or Si and nitroglycerin, which may be gelatinized with nitrocellulose or **nitrostarch**, is specified.

~0 Citings

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194. Ammonium nitrate explosives

By Snelling, W. O.

From [No Corporate Source data available \(1927\)](#), US 1617182 19270208, Language: Unavailable, Database: CAPLUS

Crystals of NH_4NO_3 are prepd. contg. disseminated particles of a sensitizing agent such as TNT. This may be mixed with **nitrostarch** or other explosive ingredients.

~0 Citings

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195. Explosive

By Snelling, W. O.

From [No Corporate Source data available \(1926\), US 1588277 19260608](#), Language: Unavailable, Database: CAPLUS

Nitrostarch or other similar explosive substances are mixed with an oxidizing agent, e. g., NaNO_3 and with C_2Cl_6 or other chlorinated hydrocarbon. Toxic substances for chem. warfare may be used with the explosive.

~0 Citings

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196. Drying nitrostarch

By Bronstein, J. B.

From [No Corporate Source data available \(1926\), US 1573673 19260216](#), Language: Unavailable, Database: CAPLUS

A slurry of **nitrostarch** is placed in long narrow tubular fabric bags and these are exposed to a drying atm.

~0 Citings

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197. Explosive containing nitrostarch

By Snelling, W. O.

From [No Corporate Source data available \(1924\), US 1510348 19240930](#), Language: Unavailable, Database: CAPLUS

An explosive is formed from **nitrostarch** mixed with an oxidizing agent, a stabilizing agent and a liquid which serves as a solvent for the stabilizing agent but not for the **nitrostarch**, e. g., **nitrostarch** 50, a 10% urea soln. (in H_2O) 10 and NH_4NO_3 40 parts.

~0 Citings

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198. Ammonium nitrate explosive

By Bryan, L. O.

From [No Corporate Source data available \(1924\), US 1509393 19240923](#), Language: Unavailable, Database: CAPLUS

A blasting explosive is formed with NH_4NO_3 and finely ground propellant explosive powder such as ground smokeless powder and auxiliary ingredients, e. g., nitroglycerin, NaCl , NaNO_3 and CaCO_3 .

~0 Citings

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199. High explosive

By Marshall, J.

From [No Corporate Source data available \(1924\), US 1509362 19240923](#), Language: Unavailable, Database: CAPLUS

A finely comminuted propellant explosive, e. g., ground smokeless powder, is used in the proportion of 25% or more together with about 1-10% of dinitrotoluene or other aromatic nitro compd., completely gelatinized with the propellant explosive, and with NaNO_3 , CaCO_3 , Al or other ingredients to form a composite explosive for blasting.

~0 Citings

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200. Treating nitro-starch or similar substances

By Snelling, W. O.

From [No Corporate Source data available \(1924\), US 1504986 19240812](#), Language: Unavailable, Database: CAPLUS

A weak soln. of a reducing agent, e. g., a 2% soln. of $\text{Na}_2\text{S}_2\text{O}_3$ and H_2SO_4 in H_2O , at a temp. above 60° (preferably about 100°) is used to effect stabilization.

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201. Explosive containing nitrated glycerol and starch derivatives

By Klinger, H. W.

From [No Corporate Source data available \(1924\), US 1503956 19240805](#), Language: Unavailable, Database: CAPLUS

A mixt. of glycerol 70-90 with starch 30-10 parts is treated to convert the starch into a deriv. sol. in the glycerol (which may be effected by heating with a small proportion of HCl or H_2SO_4) and the soln. thus obtained is nitrated with a mixt. of HNO_3 and H_2SO_4 . The nitrated mixt. thus formed is washed with H_2O and an alk. soln.

~0 Citings

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202. Fertilizer

By Snelling, W. O.

From [No Corporate Source data available \(1924\), US 1497600 19240610](#), Language: Unavailable, Database: CAPLUS

A fertilizer is formed of a nitrated carbohydrate and an alkali or nitrate, e. g., **nitrostarch** and lime or NH_4NO_3 .

~0 Citings

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203. Nitrostarch explosive

By Snelling, W. O.

From [No Corporate Source data available \(1923\), US 1472691 19231030](#), Language: Unavailable, Database: CAPLUS

Nitrostarch 40 and $\text{Pb}(\text{NO}_3)_2$ 57 are used together with oil 3% for filling shells. For other purposes the proportions may be varied somewhat and other ingredients added.

~0 Citings

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204. Explosives

By Snelling, W. O.

From [No Corporate Source data available \(1923\), US 1473257 19231106](#), Language: Unavailable, Database: CAPLUS

A resinate, e. g., glycerol ester of rosin or Ca resinate, is used with detonating and oxidizing agents such as **nitrostarch** and NH_4NO_3 , NaNO_3 , oil and ZnO to avoid caking such as may result from the use of free resins.

~0 Citings

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205. Detonator

By Snelling, W. O.

From [No Corporate Source data available \(1923\), US 1462074 19230717](#), Language: Unavailable, Database: CAPLUS

Detonators are formed with an initial priming charge of Hg fulminate mixt. or a similarly acting material, and a main charge contg. **nitrostarch** together with an oxidizing agent, e. g., KClO_3 , and a stabilizing agent such as diphenylamine. U. S. 1,462, 075 relates also to detonator compns. contg. **nitrostarch** and KClO_3 or other oxidizing agent, with or without di-phenylamine.

~0 Citings

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206. Detonator composition

By Waller, C. E.

From [No Corporate Source data available \(1923\), US 1462093 19230717](#), Language: Unavailable, Database: CAPLUS

Primer compns. are formed of **nitrostarch** in granules of an av. size in excess of 0.045 mm. together with oxidizing and stabilizing agents such as KClO_3 and diphenylamine.

~0 Citings

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207. Mixture for detonating explosives

By Grotta, B.

From [No Corporate Source data available \(1923\), US 1453976 19230501](#), Language: Unavailable, Database: CAPLUS

A mixt. of high detonating power, which does not readily become "dead pressed" and is not readily affected by moisture, is formed of Hg fulminate 60, mercurous azide 20, and KClO_3 20% which is used with a charge of about an equal amt. of tetryl or a similar base charge, e. g., tetranitroaniline, **nitrostarch**, T.N.T., hexanitrodiphenylamine or cyclotrimethylenetrinitramine. Cf. C. A. 17, 883.

~0 Citings

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208. Explosive

By Snelling, W. O.

From [No Corporate Source data available \(1923\), US 1456341 19230522](#), Language: Unavailable, Database: CAPLUS

An explosive which can be used in mining is formed of a detonating agent such as **nitrostarch** mixed with an oxidizing salt, e. g., NH_4NO_3 and NaNO_3 , and wood pulp impregnated with NaCl .

~0 Citings

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209. Removing moisture from organic nitrates

By Snelling, W. O.; Lams, W. R.

From [No Corporate Source data available \(1923\), US 1441130 19230102](#), Language: Unavailable, Database: CAPLUS

Wet materials such as **nitrostarch** are mixed with dry NH_4NO_6 or a similarly acting H_2O -sol. hygroscopic solid material which takes up a portion of the moisture present and forms a soln. which is drawn off.

~0 Citings

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210. The determination of nitrogen in nitric acid esters

By Kessler, H.; Rohm, R.; Lutz, G.

From [Angewandte Chemie \(1922\), 35, 145](#). Language: Unavailable, Database: CAPLUS

In substances such as nitro-starch, the N content may be detd. by sapon. and reduction in an alk. soln., distg. off the NH_3 and catching the distillate in a known quantity of acid. To 0.25 g. of substance in a 50 cc. beaker, add a few drops of alc. and 5 cc. of warm, 50% KOH soln. If the alkali is too hot the reaction may become too violent. Allow the mixt. to stand a few hrs. until the substance has dissolved; hereby KNO_2 and KNO_3 are formed. Transfer the soln. to a 500 cc. round-bottomed flask, add about 500 cc. of water, 50 cc. of 33% KOH soln. and 1.5 g. of powd. Devarda's alloy. Heat gently to start the reduction, stopping when the evolution of H_2 begins. After about 90 min. the reduction will be complete. Distil off the NH_3 , catching the distillate in a measured vol. of 0.1 N H_2SO_4 and finally titrating the excess acid with standard NaOH soln. using methyl red as indicator. The procedure has been tested with nitrocellulose, nitroglycerin, nitroglycol and ethyl nitrate. In some case the initial sapon. requires 30 min. on the water bath.

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211. The determination of free acid in aluminium sulfate solutions

By Zschokke, H.; Hauselmann, L.

From [Chemiker-Zeitung \(1922\)](#), 46, 302. Language: Unavailable, Database: CAPLUS

By adding BaCl_2 , $\text{K}_4\text{Fe}(\text{CN})_6$ and gelatin to an aq. alum soln., the Al is pptd. and, after filtration the free acid can be detd. by direct titration with NaOH. Into a 100 cc. calibrated flask, introduce 10 cc. of the alum soln., 10 cc. of 10% BaCl_2 soln., 5 cc. of 10% $\text{K}_4\text{Fe}(\text{CN})_6$ soln. which is not over 6 days old and 60 cc. of boiling water. While shaking, add warm, 2% gelatin soln. (1 to 1.5 cc.) until the Al ppt. is flocculent and settles well. Dilute to exactly 100 cc., filter, and take 50 cc. of the filtrate for titration with 0.1 N, NaOH, using methyl orange as indicator. The gelatin soln. can be preserved by adding a little nitrobenzene and is suitable as long as it is a jelly in the cold.

~0 Citings

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212. The nitric acid esters of starch

By Kessler, H.; Rohm, R.

From [Angewandte Chemie \(1922\)](#), 35, 125-8. Language: Unavailable, Database: CAPLUS

A review of their chemistry.

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213. Fertilizer

By Snelling, W. O.

From [No Corporate Source data available \(1922\)](#), US 1410037 19220321, Language: Unavailable, Database: CAPLUS

Nitrated starch or cellulose is used as a fertilizer together with NH_4NO_3 .

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214. The commercial utilization of smokeless powder

By Anon.

From [Army Ordnance \(1922\)](#), 2, 233. Language: Unavailable, Database: CAPLUS

Successful application of nitrocellulose smokeless powder in the manuf. of artificial leather is being made in this country by grinding the powder, treating it with a suitable "mixed acid" to denitrate it, and dissolving in a suitable solvent. 35,000,000 lbs. of cordite were recently purchased from the British Gov't. for this use but with this the removal of nitroglycerin is essential. These powders are of use in the manuf. of lacquers, plastics and blasting explosives. For the latter it is simply necessary to grind the grains to dust when the material becomes changed from a propellant to a detonating explosive. It is used alone or mixed with [nitrostarch](#), TNT, and the like and oxidizers such as NaNO_3 . The fixed N can be obtained for use in fertilizers by decomposing the powder with H_2SO_4 , distg. off the HNO_3 and collecting it in NaOH soln.

~0 Citings

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215. Nitrostarch explosives

By Bronstein, J. B.

From [No Corporate Source data available \(1921\)](#), US 1398931 19211129, Language: Unavailable, Database: CAPLUS

Voids of nitrostarch explosives are filled with glucose or glucose mixts. to obtain a solid or plastic mixt. of increased velocity of detonation. A mixt. formed of starch, H₂O and glucose may be added to explosives contg. nitrostarch and inorg. nitrates.

~0 Citings

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216. Removing water from nitrostarch, etc.

By Snelling, W. O.

From [No Corporate Source data available \(1921\)](#), US 1395776 19211101, Language: Unavailable, Database: CAPLUS

The H₂O content of wet nitrostarch or similar substances is reduced by mixing the material with a concd. soln. of NH₄NO₃ or similar compd. having a high soly. in H₂O and then removing the excess soln. by centrifuging. NaNO₃, NH₄ClO₄ or other oxidizing salts may be added.

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217. Explosive

By Snelling, W. O.

From [No Corporate Source data available \(1921\)](#), US 1395775 19211101, Language: Unavailable, Database: CAPLUS

An explosive which can be detonated is formed of NH₄NO₃ 85-97 parts or other nitrate coated with a solid nonexplosive vulcanized oil, e. g., the product formed by treating cottonseed oil with S chloride, admixed with a sensitizing solid detonating substance such as nitrostarch 3-15 parts.

~0 Citings

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218. Nitrostarch and its use in the manufacture of propellants and blasting explosives

By Oelker, A.

From [Zeitschrift fuer das Gesamte Schiess- und Sprengstoffwesen \(1921\)](#), 16, 97-8,107-9. Language: Unavailable, Database: CAPLUS

A review of patents covering the period from about 1899 to 1917.

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219. Binder for combustible materials

By Aurand, E. P.

From [No Corporate Source data available \(1921\)](#), US 1388501 19210823, Language: Unavailable, Database: CAPLUS

A binder of gelatinized nitrostarch is used with combustible materials such as signal flare, rocket or colored-fire mixts.

~0 Citings

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220. Torch fuse-lighter

By Aurand, E. P.

From [No Corporate Source data available \(1921\), US 1388502 19210823](#), Language: Unavailable, Database: CAPLUS

Gelatinized **nitrostarch** is employed as a binder for mealed black gunpowder or similar material for making fuse-lighting torches.

~0 Citings

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221. Nitrostarch explosives

By Snelling, W. O.

From [No Corporate Source data available \(1921\), US 1386440 19210802](#), Language: Unavailable, Database: CAPLUS

An oil such as lard oil, cottonseed oil or mineral oil is added to **nitrostarch** explosives, to the amt. of 2-17%, as a desensitizing agent.

~0 Citings

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222. Preparing explosives from undried organic nitrates

By Snelling, W. O.

From [No Corporate Source data available \(1921\), US 1386439 19210802](#), Language: Unavailable, Database: CAPLUS

H₂O present in undried org. nitrates such as **nitrostarch** is displaced by a concd. soln. of NH₄NO₃ or other inorg. nitrate, which forms an explosive directly without evaporative drying.

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223. Explosives

By Snelling, W. O.

From [No Corporate Source data available \(1921\), US 1386438 19210802](#), Language: Unavailable, Database: CAPLUS

H₂O in excess of 3% together with CdO, Cd(OH)₂, ZnO or Zn(OH)₂ 3-4% is present in explosives mainly formed of **nitrostarch** and NH₄NO₃. The H₂O and hydroxide serve to reduce sensitivity to blows or friction. The proportions of the ingredients of the explosive may be **nitrostarch** 20-60, NH₄NO₃ 60-20, H₂O 3-15 and ZnO 1-5%

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224. Nitrostarch explosive

By Snelling, W. O.

From [No Corporate Source data available \(1921\), US 1386437 19210802](#), Language: Unavailable, Database: CAPLUS

Deliquescent salts such as NH₄NO₃ are used in **nitrostarch** explosives together with sufficient H₂O to hold a substantial portion of the salt in soln., in order to reduce the sensitivity to shock or friction.

~0 Citings

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225. Nitrostarch explosive

By Waller, C. E.

From [No Corporate Source data available \(1921\), US 1386478 19210802](#), Language: Unavailable, Database: CAPLUS

An explosive of high brisance is formed of **nitrostarch** 60-70, NH_4NO_3 19-9, $\text{Ca}(\text{NO}_3)_2$ 4-8 and H_2O 17-13%.

~0 Citings

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226. Explosive

By Snelling, W. O.

From [No Corporate Source data available \(1921\), US 1382563 19210621](#), Language: Unavailable, Database: CAPLUS

An explosive adapted for use as a "booster" charge is formed of **nitrostarch** desensitized by heavy mineral oil and mixed with paraffin or similar waxy material, together with nitrates, chlorates or perchlorates.

~0 Citings

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227. Nitrostarch

By Anchors, G. R.

From [No Corporate Source data available \(1921\), US 1376598 19210503](#), Language: Unavailable, Database: CAPLUS

Starch or a puffed cereal to be nitrated is placed in a nitrating vessel and the nitrating acids are then introduced from the bottom of the vessel in order to displace air from the material. Cf. C. A. 14, 1045.

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228. Explosive

By Olsen, F.

From [No Corporate Source data available \(1921\), US 1376030 19210426](#), Language: Unavailable, Database: CAPLUS

An explosive containing **nitrostarch**. e. g., "Trojan" grenade or mortar shell powder, is mixed with a propellant powder such as ordinary smokeless powder in order to form an explosive suitable for ordinary blasting.

~0 Citings

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229. Desensitized nitrostarch explosive

By Gillespie, K. A.

From [No Corporate Source data available \(1921\), US 1370015 19210301](#), Language: Unavailable, Database: CAPLUS

Nitrostarch in undried condition, desensitized by the presence of H_2O and an oil such as a heavy petroleum lubricating oil is used in explosives, together with gum arabic. The explosive thus formed is not ignited by the impact of a rifle bullet.

~0 Citings

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230. Explosive

By Hill, R. L.

From [No Corporate Source data available \(1920\), US 1360397 19201130](#), Language: Unavailable, Database: CAPLUS

Explosives adapted for use in blasting are formed of NH_4ClO_4 45-55, **nitrostarch** 35-45 and an oil or oily nitro compd. such as nitrated solvent naphtha 0-5 parts. U. S. 1,360,398-9 relate also to explosives containing NH_4ClO_4 45-55 and **nitrostarch** 35-45 parts, with or without ingredients such as oils, nitrates, S or MnO_2 , which may be added for the purpose of modifying the explosives to adapt their properties to various requirements. Cf. C. A. 14, 1609.

~0 Citings

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231. A **nitrostarch** stumping powder for land clearing

By Swenehart, John

From [Stencil Bull. \(1920\), 33, 9 pp.](#), Language: Unavailable, Database: CAPLUS

Results are given of tests of a **nitrostarch** mixt. submitted by the Trojan Powder Co. for detonation, sensitiveness to impact of rifle balls, explosion by sympathy, inflammability, resistance to moisture, effect of moisture on detonation and efficiency in use, effect of temp. and toxic effect. Tables of data from the use of this explosive, and that of 20% ammonia dynamite are given with the statement that "no definite inference should be made other than that the **nitrostarch** explosive gives comparatively effective results. More data would be necessary to justify a statement of comparative strengths."

~0 Citings

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232. A fatal blasting accident

By Bowles, Oliver; Crawshaw, J. E.

From [Repts. of Investigations, Bureau of Mines \(1920\), \(No. IX; Mimeographed. III\), 3 pp.](#), Language: Unavailable, Database: CAPLUS

Six churn drill holes in limestone were being prepared for blast. An incline had previously been made for a track so that Nos. 1 and 2 holes were 73 ft. deep while the rest were but 55 ft. The loading of NO. 2 was begun while men were working on the incline and after 12-13 cases of **nitrostarch** powder had been put in the hole it was tamped, to provide sufficient space for the stemming, with a plunger 3-3.5 in. in diam., 10 in. long, weighing 30-40 lbs., made of Pb with an Fe core and an Fe eye in the top to which a 3/4 in. rope was attached. The tamping had continued about 10 min. when the charge exploded killing the man doing the tamping and 5 men on the lower beach besides injuring 2 on the upper bench and one on the lower. It is advized that workmen should never be allowed at a quarry face after loading has begun. That a wooden tamping bar only should be used in tamping explosive. That if a Pb plunger is necessary, to sink powder in wet holes, it should be provided with a Cu rather than an Fe eye. The subjecting of any explosive to frequent impacts with any heavy weight is dangerous practice. In the discussion of the accident, a review of 5 similar accidents is given.

~0 Citings

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233. Modified TNT as a blasting explosive

By Munroe, Charles E.; Howell, S. P.

From [Repts. of Investigations, Bureau of Mines \(1920\)](#), Language: Unavailable, Database: CAPLUS

Mimeographed; cf. C. A. 14, 1897. Among the surplus explosives released by the War Dept. for industrial use was a considerable quantity of Trojan Grenade Powder, composed of **nitrostarch**, NaNO_3 and NH_4NO_3 , with a small amt. of "oils." When sought for issue the explosive was found to have absorbed so much moisture as to have become too inert to fire. Since it costs money and entails danger to destroy explosives, means of utilizing this material were sought and it was found that by simple admixt. with TNT, even of the lowest grade, up to 50-50, an efficient explosive was obtained. In fact, the absorption of the moisture of the Trojan Grenade Powder by the TNT eliminated the dusty characteristics of the latter with the result that rate of cartridging was increased and the danger to the workmen from inhalation of TNT dust was reduced. This mixt. is styled "Modified TNT" and it is being used successfully on public works.

~0 Citings

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234. Stabilizing nitrostarch

By Flurschein, B. J.

From [No Corporate Source data available \(1920\), US 1343317 19200615](#), Language: Unavailable, Database: CAPLUS

Nitrostarch is stabilized by treatment with a boiling soln. of cyanamide or CaCN_2 .

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235. Ammonium nitrate explosive

By Bronstein, J. B.; Waller, C. E.

From [No Corporate Source data available \(1920\), US 1343077 19200608](#), Language: Unavailable, Database: CAPLUS

An explosive is formed by mixing "a substantially non-explosive" mixt. which may be formed of NH_4NO_3 93 and TNT 7 parts with about 10-20% its wt. of a detonating substance such as nitrostarch to sensitize it. The composite explosive thus formed is suitable for use in coal mining.

~0 Citings

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236. Ammonium nitrate explosive

By Snelling, W. O.

From [No Corporate Source data available \(1920\), US 1343063 19200608](#), Language: Unavailable, Database: CAPLUS

An explosive is formed of NH_4NO_3 60, nitrostarch 12, NaNO_3 18, hydrocarbon oil 2 and Fe oxide (rouge) 8 parts.

~0 Citings

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237. Explosive

By Hill, R. L.

From [No Corporate Source data available \(1920\), US 1334303 19200323](#), Language: Unavailable, Database: CAPLUS

An explosive suitable for blasting is formed of NH_4ClO_4 45-55%, nitrostarch 35-45% and NaNO_3 or other similar compd. which will combine with Cl produced by the explosion and will thus serve to avoid liberation of Cl or HCl. A small amt. of oil, a liquid nitro compd., MnO_2 and S also may be added.

~0 Citings

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238. Explosives

By Mardick, J. R.

From [No Corporate Source data available \(1920\), US 1335790 19200406](#), Language: Unavailable, Database: CAPLUS

An explosive is formed by mixing NH_4NO_3 40 with 3 parts of dinitrotoluene which has been gelatinized with nitrocellulose, nitrostarch or rosin, at a temp. of 80-100°, until the surfaces of the nitrate particles are thoroughly coated, and then, without further heating, adding in the order given TNT 15, $\text{Ph}(\text{NO}_3)_2$ 32, and ferro-Si 10 parts. The material may be charged into cartridges in the same manner as dynamite. Wood flour 3-5% and CaCO_3 1% or less may be used as additional ingredients. Other similar mixts. may be formed of oxidizing agents such as various nitrates, chlorates or perchlorates, ferro-Si or silicides of Mg and gelatinized mixts. of nitro compds. such as dinitrobenzene, liquid nitroxylenes, picric acid, TNT, tri- or tetranitronaphthalene or trinitroresols.

~0 Citings

239. Nitrating starch

By Anchors, G. R.

From [No Corporate Source data available \(1920\), US 1329353 19200203](#), Language: Unavailable, Database: CAPLUS

Cereals such as wheat or corn or rice are baked until they puff or swell and are then treated with a mixt. of HNO₃ 30%, H₂SO₄ 64% and H₂O 6 %, at a temp. of about 5° to effect nitration of the starch contained in the material. The acid mixt. is supplied to the bottom of the receptacle containing the cereal which tends to force out the air occluded in the material and to prevent local heating. The porous condition of the material due to the puffing facilitates rapid and uniform nitration. The puffed material is sufficiently buoyant that it floats on the spent acids and washing water. The washed nitro product is boiled repeatedly for 12 hrs. in a 0.5 % soln. of H₂SO₄ and is stabilized by the addition of a small amt. of Na soap or other fatty acid salt, followed by repeated washing with H₂O and centrifuging.

~0 Citings

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240. Nitro-starch explosives

By Snelling, W. O.; Lams, W. R.

From [No Corporate Source data available \(1920\), US 1329212 19200127](#), Language: Unavailable, Database: CAPLUS

Nitro-starch particles are coated with a thin film of a heavy mineral oil and the coated particles are then treated with an org. stabilizing agent such as diphenylamine which is sol. in the oil. The oil prevents colloid by the stabilizer. An explosive may be made up of nitro-starch 25, NH₄NO₃ 33, NaNO₃ 38, charcoal 2, NaHCO₃ 0.5, diphenylamine 0.3 and oil 1 part.

~0 Citings

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241. Nitro-starch explosives

By Snelling, W. O.; Lams, W. R.

From [No Corporate Source data available \(1920\), US 1329211 19200127](#), Language: Unavailable, Database: CAPLUS

Nitro-starch particles are coated with a thin film of a heavy mineral oil and the coated particles are then treated with an org. stabilizing agent such as diphenylamine which is sol. in the oil. The oil prevents colloid by the stabilizer. An explosive may be made up of nitro-starch 25, NH₄NO₃ 33, NaNO₃ 38, charcoal 2, NaHCO₃ 0.5, diphenylamine 0.3 and oil 1 part.

~0 Citings

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242. Explosive

By Hudson, W. G.

From [No Corporate Source data available \(1920\), US 1329525 19200203](#), Language: Unavailable, Database: CAPLUS

An explosive suitable for use as a detonating charge is formed of colloid nitrocellulose 10-20 and Pb azide 90-80%. The "colloid nitrocellulose" may be formed of nitroglycerin 93-70% and nitrocellulose 7-30%.

~0 Citings

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243. Recovering acids used in nitration

By Skoglund, J. V.

From [No Corporate Source data available \(1919\), US 1311017 19190722](#), Language: Unavailable, Database: CAPLUS

In sepg. nitration acids from products such as nitrocellulose or **nitrostarch**, the product is successively treated with different portions of acids each more dil. than the preceding, and finally with H₂O. This avoids any danger from overheating such as might take place if H₂O were added to the strong residual nitration acids without the intervening displacement with weaker acids. In treating **nitrostarch**, the later may be placed on a "filtros" plate, the strong acid drawn off through the plate, replaced by acid of 56° B'e., then with acid of 42° B'e., and then with H₂O while the temp. is maintained below 20°. The acids may be removed through the "filtros" plate by suction.

~0 Citings

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244. Nitrostarch explosive

By Snelling, W. O.

From [No Corporate Source data available \(1919\), US 1310969 19190722](#), Language: Unavailable, Database: CAPLUS

A smokeless powder is formed of granules of **nitrostarch** uncolloided in their interior and superficially colloided by treatment with a solvent such as "liquid TNT" to secure adhesion of the granules.

~0 Citings

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245. Nitrostarch explosive

By Waller, C. E.

From [No Corporate Source data available \(1919\), US 1305846 19190603](#), Language: Unavailable, Database: CAPLUS

Mononitro-naphthalene is added to **nitrostarch** explosives to reduce their inflammability. Explosives of this type may, e. g., be formed of **nitrostarch** 20, NaNO₃ 51, NH₄NO₃ 20, mononitronaphthalene 7, paraffin oil 1, and CaCO₃ 1 part; or **nitrostarch** 25, NaNO₃, 60, mononitronaphthalene 8, S 5, paraffin oil 1, and CaCO₃ 1 part. In the manuf. of the explosive, the mononitronaphthalene is melted and incorporated with the oxidizing salts and when the mass has cooled the **nitrostarch** and other ingredients are added.

~0 Citings

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246. Nitrostarch explosive

By Waller, C. E.

From [No Corporate Source data available \(1919\), US 1305845 19190603](#), Language: Unavailable, Database: CAPLUS

A granular uncompressed explosive suitable for use in blasting and having good water-resisting properties is formed of **nitrostarch** 10%, NaNO₃, 73%, S 7.5%, charcoal 7.5%, CaCO₃ 1% and dried starch paste 1%.

~0 Citings

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247. Nitrostarch explosive

By Snelling, W. O.

From [No Corporate Source data available \(1919\), US 1305946 19190603](#), Language: Unavailable, Database: CAPLUS

Nitro-starch (containing 12.8% N) 85 parts is mixed with cold "liquid trinitrotoluene" 15 parts. Only slight gelatinization is effected, the "liquid trinitrotoluene" being merely spread over the surfaces of the **nitrostarch** granules. The mixt. is then heated for about 15 min. to a temp. of about 80° and is thus converted into a tough colloidal mass which is suitable for use as smokeless powder as it burns with great uniformity and is sufficiently tough to withstand the high pressures in guns without breaking up or producing erratic ballistic results.

~0 Citings

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248. Easily combustible paper

By Harrison, C. R.; Bacon, W.

From [No Corporate Source data available \(1916\)](#), GB 124516 19190403, Language: Unavailable, Database: CAPLUS

In the manuf. of paper of increased combustibility, which can be destroyed easily and effectively if desired, ordinary pulp is beaten up with a substantial proportion of nitrocellulose, gun cotton, **nitrostarch**, or the like, and the materials are made into paper in the ordinary way. After sizing, it is preferred to add a quantity of insol. Ca or Mg salts, such as CaCO_3 or MgCO_3 , which serve to increase the combustibility, and the finished paper may be impregnated with a soln. of a metallic nitrate such as NaNO_3 for the same purpose. Paper may be made with nitrocellulose as the base.

~0 Citings

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249. Method of calculating comparative strength and efficiency of high explosives from their composition and apparent densities

By Waller, C. E.

From [Journal of Industrial and Engineering Chemistry \(Washington, D. C.\) \(1918\)](#), 10, 448-53. Language: Unavailable, Database: CAPLUS, DOI:10.1021/ie50102a019

The term "efficiency," as used in this article, denotes the max. available energy stored up in a unit "bulk" of an explosive and is proportional to the vol. which the gaseous products of the explosion of a unit "bulk" would occupy at T° and atm. pressure. The method used in calcg. T° is practically the same as that given in Bureau of Mines Bull. 15, except that in constructing the chemical equations representing the explosion special rules have been outlined and followed. In W.'s table of calcns. of T° , and gas vol. at T° per g., tetranitroaniline (T. N. A.) is 3238° and 10.55 l., nitroglycerin 3188° and 8.8328 l., **nitrostarch** of 13.47% N 2415.4° and 8.4937 l., trinitrotolueue (T. N. T.) 2217° and 6.764 l., while T. N. T., 21.27%, and NH_4NO_3 , 78-73%, is 2310° and 8.2622 l.

~0 Citings

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250. Nitrostarch

By Sadtler, S. S.

From [No Corporate Source data available \(1916\)](#), CA 170773 19160711, Language: Unavailable, Database: CAPLUS

The impurities are removed from the starch by oxidation; the product is nitrated and washed.

~0 Citings

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251. Nitrostarch as an explosive

By Sadtler, S. S.

From [Chemical and Metallurgical Engineering \(1917\)](#), 16, 361-4. Language: Unavailable, Database: CAPLUS

The author claims by his process to produce **nitrostarch** containing 12-13.3% N which is stable. It is cheap, as powerful as nitroglycerin, and as the price of glycerol is continually increasing this is offered as a substitute for the nitroglycerin in commercial operations especially. **Nitrostarch** is insensitive and cannot be exploded except by a detonator. It does not yield injurious fumes. It is non-hygroscopic. It is insol. in water but dissolves in acetone and amyl acetate. It is denser than nitrocellulose, may form a gelatin with nitroglycerin but where 5-6% of nitrocellulose is required for this purpose 80-85% of **nitrostarch** is required. One lb. of dry starch produces 1.5 lb. **nitrostarch**; d. 1.57, Abel test 175°F . 30 min., Sy, stability test at 165°C . 1 min., 35 sec., combustion test 182°C ., at 135° not exploded in 30 min., KI and starch test at 70°C ., 65 min.

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252. Nitrostarch

By Sadtler, S. S.

From [No Corporate Source data available \(1917\)](#), US 1211761 19170109, Language: Unavailable, Database: CAPLUS

Stable **nitrostarch** for use in explosives is formed by treating starch for 2-4 hrs. with a cold 1.5% soln. of NaOH equal to 2% the wt. of the starch, to remove oil and proteins and swell the starch granules, rinsing with several changes of H₂O, agitating with a 2% soln. of bleaching powder (calculated on the wt. of the starch), washing with H₂O slightly acidulated with HCl, drying and then nitrating the purified starch with a bath containing H₂SO₄ 65%, HNO₃ 25% and H₂O 10%, boiling the nitrated product with H₂O and Na₂CO₃ soln. and finally subjecting to prolonged washing with H₂O.

~0 Citings

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253. Nitrostarch explosive

By Bronstrin, J. B.; Walter, C. E.

From [No Corporate Source data available \(1916\)](#), US 1188246 19160620, Language: Unavailable, Database: CAPLUS

A detonating explosive is formed of **nitrostarch** 40, Ba(NO₃)₂ 20, NaNO₃ 18-38 parts, with or without the addition of 3 parts or less of S or small amts. of NH₄NO₃, trinitrotoluene, CaCO₃ or paraffin oil.

~0 Citings

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254. Nitrostarch explosive

By Bronstein, J. B.; Waller, C. E.

From [No Corporate Source data available \(1916\)](#), US 1188245 19160620, Language: Unavailable, Database: CAPLUS

Nitrostarch 26-30, cereal screenings 5-8 and S (which may be omitted) not more than 5 parts are mixed with paraffin oil 0.4-0.5, NaNO₃ 58-65 and CaCO₃, 1.5 parts, to form a detonating explosive.

~0 Citings

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255. Nitrostarch explosive

By Bronstun, J. B.; Waller, C. U.

From [No Corporate Source data available \(1916\)](#), US 1188244 19160620, Language: Unavailable, Database: CAPLUS

Nitrostarch 30-45, NH₄NO₃ 10-30, trinitrotoluene 2-10, Ba(NO₃)₂ (which may in part be substituted by NaNO₃) 45, and S (which may be omitted) not more than 10 parts are mixed with about 2-3 parts of cereal "screenings" or similar carbonaceous material, to form a detonating explosive. About 0.5-1-.5% of CaCO₃ and paraffin oil also may be added. The NH₄NO₃ and trinitrotoluene are fused together before they are mixed with the other ingredients.

~0 Citings

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256. Manuf. of celluloid, and with or without the addition of a volatile solvent.

No Inventor data available

From [No Corporate Source data available \(1912\)](#), GB 1222623 19121004, Language: Unavailable, Database: CAPLUS

Nitrostarch or esters of cellulose are mixed with an aldol such as acetaldol, as a substitute for the whole or a part of the camphor usually employed in the manuf. of celluloid, and with or without the addition of a volatile solvent. Acetaldol, which is liquid, polymerizes into a solid at ordinary temps. and the polymerized product is reconverted into liquid acetaldol on heating. The liquid form is a good solvent for nitrocellulose. Products made by this process may be reworked by heating to a comparatively low temp. The comp. may be used for making artificial horn and leather, for photographic films, and for other puaposes.

~0 Citings

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257. Gelatinized propellant explosives.

By Nathan, F. L.; Rintoul, W.; Baker, F.

From [No Corporate Source data available \(1912\)](#), GB 1212746 19120530, Language: Unavailable, Database: CAPLUS

In the manuf. of gelatinized propellant explosives containing nitro compds. such as nitrocellulose, nitromannitol, **nitrostarch**, and nitroglycerin, rendering the products more stable by the addition thereto of 1 or more anilides. The anilides used are organic amides of the formula $RCONH_2$ in which 1 of the H ats. of the NH_2 group is replaced by an aromatic radicle and in which the 2nd H at. may be replaced by an aromatic or aliphatic radicle. In an example, the explosive contains 30% nitroglycerin, 65% guncotton, and 5% phenylacetanilide.

~0 Citings

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258. Explosives.

By Nathan, F. L.; Rintoul, W.; Baker, F.

From [No Corporate Source data available \(1912\)](#), GB 1212745 19120530, Language: Unavailable, Database: CAPLUS

In the manuf. of explosives containing nitrocellulose, nitroglycerin, **nitrostarch**, nitromannitol, or other nitric ester, improving their stability by the addition of ureas in which 1, 2 or 3 ats. of H are replaced by aromatic radicles. In an example, the explosive contains 30% nitroglycerin, 65% guncotton, and ethylphenylurea.

~0 Citings

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259. Explosives.

By Nathan, F. L.; Rintoul, W.; Baker, F.

From [No Corporate Source data available \(1912\)](#), GB 1212743 19120530, Language: Unavailable, Database: CAPLUS

In the manuf. of explosives containing nitroglycerin, nitrocellulose, nitromannitol, **nitrostarch**, or other nitric ester, improving their stability by the addition of esters of substituted carbaminic acid containing 1 or more aromatic radicles, instead of by the addition of vaseline or mineral jelly as heretofore. These esters have the formula $NH_2.CO.OR$, in which R is an alkyl or aromatic radicle, and in which 1 of the H atoms, or both of them, are replaced by an alkyl or aromatic radicle, provided the ester contains at least 1 aromatic radicle. In an example, the explosive contains 30% of nitroglycerin, 65% guncotton, and 5%, methylphenylurethan. These esters may be prepared (1) by the action of primary or secondary amines on esters of chloroformic acid, thus ethyl chloroformate and aniline yield phenylurethan, (2) by the action of alkali salts of phenol on urea chloride, thus Na phenate in alc. soln. and diphenylurea chloride also in alc. soln. yield phenyl diphenylcarbamate, or (3) by the action of alcs. or phenols on aromatic isocyanates, thus phenol and phenylisocyanate when heated with a small quantity of $AlCl_3$ yield phenyl carbamate.

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260. Explosives.

By Nathan, F. L.; Rintoul, W.; Baker, F.

From [No Corporate Source data available \(1912\)](#), GB 1212742 19120530, Language: Unavailable, Database: CAPLUS

In the manuf. of explosives containing nitrocellulose, nitromannitol, **nitrostarch**, or nitroglycerin, adding substances such as simple or mixed esters containing at least 1 aromatic radicle capable of ready nitration by the products of decomp. of the nitro explosives, having no deleterious action on the explosive, and capable of being homogeneously retained in the explosive in sufficient quantity for effective stabilization. Diphenyl ether, phenylbenzyl ether, ethyl-naphthyl ether, and phenanthrylmethyl ether, are specially mentioned. In an example, the explosive contains 30% of nitroglycerin, 65% of guncotton, and 5% of ethyl- β -naphthyl ether.

~0 Citings

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261. Historical Studies

By MacDonald, G. W.

From [Zeitschrift fuer das Gesamte Schiess- und Sprengstoffwesen \(1910\), 5, 191-3](#). Language: Unavailable, Database: CAPLUS

A translation of the following papers by the above author in Arms and Explosives, June to Oct., 1908: "The Discovery of Nitrostarch (1833); The Discovery of Guncotton; Guncotton in France (1846); Guncotton in Scotland (1847); Guncotton in England (1846-7)."

~0 Citings

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262. Nitrate of Starch

By Berl, E.; Butler, R.

From [Zeitschrift fuer das Gesamte Schiess- und Sprengstoffwesen \(1910\), 5, 82](#). Language: Unavailable, Database: CAPLUS

The authors experimented with the method of A. Hough (Ger. Pat. 172,549; *Ibid.*, 2, 295) for prep. of nitrostarch. Hough claimed to prepare a product of 16.38% N, using oleum to maintain about 2% free SO₃ in the acid mixture during nitration. This would correspond to 16 nitric radicals in the mol. C₂₄H₄₀O₂₀, whereas other investigators have shown not more than 12 (14.14% N). Hough's method was followed exactly, using starch from various sources. His results as to N content were not confirmed, but interesting values were found for viscosity of the products. The most important of the tabulated results are noted below: The following comparison was made under the same conditions of nitrating, as regards acid mixture, time, temp., etc.: This remarkable difference in viscosity is explained by the hypothesis that there is a difference between cellulose and starch in the mol. size and weight. Similarly may be explained the relative rate of hydrolysis of these two substances. The starch nitrates were pure white, soluble in conc. H₂SO₄, and more hygroscopic than cellulose nitrates of equal N content. Combined H₂SO₄ (about 0.5%) was found, due probably to imperfect purification.

~0 Citings

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263. The Manufacture and Properties of Some Starch Esters

By Traquair, John

From [Journal of the Society of Chemical Industry, London \(1909\), 38, 288-91](#). Language: Unavailable, Database: CAPLUS

The author holds the view that starch is a coagulated substance solidified in the plant from an apparently dissolved state. He discusses the formation and properties of starch nitrate, formate and acetate. The manufacture, properties and uses of "feculose," an AcOH ester of starch, are given.

~0 Citings

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264. The Quantity of Non-sugars that Enter the Lime Cake from the Raw Juice

By Weisberg, J.

From [Westnik. Sacch. Prom. \(1909\), 2, 36](#). Language: Unavailable, Database: CAPLUS

Commenting on the work of Claassen (C. A., 2, 2739-3164) and Heinze (C. A., 2, 3165) on this subject, he takes exceptions to some of their views, proving by an example wherein they are wrong. He summarizes his views. (1) The indirect estimation of the quantity of non-sugars from the apparent purity of the raw juice and that of the thick juice gives admissible figures. (2) Only very small insignificant losses of sugar by breaking up are experienced in good work in passing from raw juice to thick juice. In a study of this kind great care has to be exercised in the collection of samples and analysis, taking the results of average analyses.

~0 Citings

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265. Explosives.

By Holmes, Fletcher B.

From [No Corporate Source data available \(1908\), US 875928 19080107](#), Language: Unavailable, Database: CAPLUS

All to explosives of nitrated starch and the following substances, respectively. Ammonium phosphate, ammonium arsenate 3%, ammonium chromate 3%, ammonium palmitate 2 to 5%, ammonium tartrate, ammonium pyrotartrate, triammonium citrate, oxamide, thiourea, 2 to 5%, a nitraniline, aniline oxalate, acetanilide, nitrotoluidine, toluidine oxalate, acetoluid and benzamide, mostly in the proportion of 2-5%, being sufficient to make the **nitrostarch** stable.

~0 Citings

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266. Explosives.

By Holmes, Fletcher B.

From [No Corporate Source data available \(1908\), US 875927 19080107](#), Language: Unavailable, Database: CAPLUS

All to explosives of nitrated starch and the following substances, respectively. Ammonium phosphate, ammonium arsenate 3%, ammonium chromate 3%, ammonium palmitate 2 to 5%, ammonium tartrate, ammonium pyrotartrate, triammonium citrate, oxamide, thiourea, 2 to 5%, a nitraniline, aniline oxalate, acetanilide, nitrotoluidine, toluidine oxalate, acetoluid and benzamide, mostly in the proportion of 2-5%, being sufficient to make the **nitrostarch** stable.

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267. Explosives.

By Holmes, Fletcher B.

From [No Corporate Source data available \(1908\), US 875926 19080107](#), Language: Unavailable, Database: CAPLUS

All to explosives of nitrated starch and the following substances, respectively. Ammonium phosphate, ammonium arsenate 3%, ammonium chromate 3%, ammonium palmitate 2 to 5%, ammonium tartrate, ammonium pyrotartrate, triammonium citrate, oxamide, thiourea, 2 to 5%, a nitraniline, aniline oxalate, acetanilide, nitrotoluidine, toluidine oxalate, acetoluid and benzamide, mostly in the proportion of 2-5%, being sufficient to make the **nitrostarch** stable.

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268. Explosives.

By Holmes, Fletcher B.

From [No Corporate Source data available \(1908\), US 875925 19080107](#), Language: Unavailable, Database: CAPLUS

All to explosives of nitrated starch and the following substances, respectively. Ammonium phosphate, ammonium arsenate 3%, ammonium chromate 3%, ammonium palmitate 2 to 5%, ammonium tartrate, ammonium pyrotartrate, triammonium citrate, oxamide, thiourea, 2 to 5%, a nitraniline, aniline oxalate, acetanilide, nitrotoluidine, toluidine oxalate, acetoluid and benzamide, mostly in the proportion of 2-5%, being sufficient to make the **nitrostarch** stable.

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269. Explosives.

By Holmes, Fletcher B.

From [No Corporate Source data available \(1908\), US 875924 19080107](#), Language: Unavailable, Database: CAPLUS

All to explosives of nitrated starch and the following substances, respectively. Ammonium phosphate, ammonium arsenate 3%, ammonium chromate 3%, ammonium palmitate 2 to 5%, ammonium tartrate, ammonium pyrotartrate, triammonium citrate, oxamide, thiourea, 2 to 5%, a nitraniline, aniline oxalate, acetanilide, nitrotoluidine, toluidine oxalate, acetoluid and benzamide, mostly in the proportion of 2-5%, being sufficient to make the **nitrostarch** stable.

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270. Explosives.

By Holmes, Fletcher B.

From [No Corporate Source data available \(1908\), US 875923 19080107](#), Language: Unavailable, Database: CAPLUS

All to explosives of nitrated starch and the following substances, respectively. Ammonium phosphate, ammonium arsenate 3%, ammonium chromate 3%, ammonium palmitate 2 to 5%, ammonium tartrate, ammonium pyrotartrate, triammonium citrate, oxamide, thiourea, 2 to 5%, a nitraniline, aniline oxalate, acetanilide, nitrotoluidine, toluidine oxalate, acetoluid and benzamide, mostly in the proportion of 2-5%, being sufficient to make the **nitrostarch** stable.

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271. Explosives.

By Holmes, Fletcher B.

From [No Corporate Source data available \(1908\), US 875922 19080107](#), Language: Unavailable, Database: CAPLUS

All to explosives of nitrated starch and the following substances, respectively. Ammonium phosphate, ammonium arsenate 3%, ammonium chromate 3%, ammonium palmitate 2 to 5%, ammonium tartrate, ammonium pyrotartrate, triammonium citrate, oxamide, thiourea, 2 to 5%, a nitraniline, aniline oxalate, acetanilide, nitrotoluidine, toluidine oxalate, acetoluid and benzamide, mostly in the proportion of 2-5%, being sufficient to make the **nitrostarch** stable.

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272. Explosives.

By Holmes, Fletcher B.

From [No Corporate Source data available \(1908\), US 875921 19080107](#), Language: Unavailable, Database: CAPLUS

All to explosives of nitrated starch and the following substances, respectively. Ammonium phosphate, ammonium arsenate 3%, ammonium chromate 3%, ammonium palmitate 2 to 5%, ammonium tartrate, ammonium pyrotartrate, triammonium citrate, oxamide, thiourea, 2 to 5%, a nitraniline, aniline oxalate, acetanilide, nitrotoluidine, toluidine oxalate, acetoluid and benzamide, mostly in the proportion of 2-5%, being sufficient to make the **nitrostarch** stable.

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273. Explosives.

By Holmes, Fletcher B.

From [No Corporate Source data available \(1908\), US 875920 19080107](#), Language: Unavailable, Database: CAPLUS

All to explosives of nitrated starch and the following substances, respectively. Ammonium phosphate, ammonium arsenate 3%, ammonium chromate 3%, ammonium palmitate 2 to 5%, ammonium tartrate, ammonium pyrotartrate, triammonium citrate, oxamide, thiourea, 2 to 5%, a nitraniline, aniline oxalate, acetanilide, nitrotoluidine, toluidine oxalate, acetoluid and benzamide, mostly in the proportion of 2-5%, being sufficient to make the **nitrostarch** stable.

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274. Explosives.

By Holmes, Fletcher B.

From [No Corporate Source data available \(1908\), US 875919 19080107](#), Language: Unavailable, Database: CAPLUS

All to explosives of nitrated starch and the following substances, respectively. Ammonium phosphate, ammonium arsenate 3%, ammonium chromate 3%, ammonium palmitate 2 to 5%, ammonium tartrate, ammonium pyrotartrate, triammonium citrate, oxamide, thiourea, 2 to 5%, a nitraniline, aniline oxalate, acetanilide, nitrotoluidine, toluidine oxalate, acetoluid and benzamide, mostly in the proportion of 2-5%, being sufficient to make the **nitrostarch** stable.

~0 Citings

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275. Explosives.

By Holmes, Fletcher B.

From [No Corporate Source data available \(1908\), US 875918 19080107](#), Language: Unavailable, Database: CAPLUS

All to explosives of nitrated starch and the following substances, respectively. Ammonium phosphate, ammonium arsenate 3%, ammonium chromate 3%, ammonium palmitate 2 to 5%, ammonium tartrate, ammonium pyrotartrate, triammonium citrate, oxamide, thiourea, 2 to 5%, a nitraniline, aniline oxalate, acetanilide, nitrotoluidine, toluidine oxalate, acetoluid and benzamide, mostly in the proportion of 2-5%, being sufficient to make the **nitrostarch** stable.

~0 Citings

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276. Explosives.

By Holmes, Fletcher B.

From [No Corporate Source data available \(1908\), US 875917 19080107](#), Language: Unavailable, Database: CAPLUS

All to explosives of nitrated starch and the following substances, respectively. Ammonium phosphate, ammonium arsenate 3%, ammonium chromate 3%, ammonium palmitate 2 to 5%, ammonium tartrate, ammonium pyrotartrate, triammonium citrate, oxamide, thiourea, 2 to 5%, a nitraniline, aniline oxalate, acetanilide, nitrotoluidine, toluidine oxalate, acetoluid and benzamide, mostly in the proportion of 2-5%, being sufficient to make the **nitrostarch** stable.

~0 Citings

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277. Explosives.

By Holmes, Fletcher B.

From [No Corporate Source data available \(1908\), US 875916 19080107](#), Language: Unavailable, Database: CAPLUS

All to explosives of nitrated starch and the following substances, respectively. Ammonium phosphate, ammonium arsenate 3%, ammonium chromate 3%, ammonium palmitate 2 to 5%, ammonium tartrate, ammonium pyrotartrate, triammonium citrate, oxamide, thiourea, 2 to 5%, a nitraniline, aniline oxalate, acetanilide, nitrotoluidine, toluidine oxalate, acetoluid and benzamide, mostly in the proportion of 2-5%, being sufficient to make the **nitrostarch** stable.

~0 Citings

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278. Explosives.

By Holmes, Fletcher B.

From [No Corporate Source data available \(1908\), US 875915 19080107](#), Language: Unavailable, Database: CAPLUS

All to explosives of nitrated starch and the following substances, respectively. Ammonium phosphate, ammonium arsenate 3%, ammonium chromate 3%, ammonium palmitate 2 to 5%, ammonium tartrate, ammonium pyrotartrate, triammonium citrate, oxamide, thiourea, 2 to 5%, a nitraniline, aniline oxalate, acetanilide, nitrotoluidine, toluidine oxalate, acetoluid and benzamide, mostly in the proportion of 2-5%, being sufficient to make the **nitrostarch** stable.

~0 Citings

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279. Explosives.

By Holmes, Fletcher B.

From [No Corporate Source data available \(1908\), US 875914 19080107](#), Language: Unavailable, Database: CAPLUS

All to explosives of nitrated starch and the following substances, respectively. Ammonium phosphate, ammonium arsenate 3%, ammonium chromate 3%, ammonium palmitate 2 to 5%, ammonium tartrate, ammonium pyrotartrate, triammonium citrate, oxamide, thiourea, 2 to 5%, a nitraniline, aniline oxalate, acetanilide, nitrotoluidine, toluidine oxalate, acetoluid and benzamide, mostly in the proportion of 2-5%, being sufficient to make the **nitrostarch** stable.

~0 Citings

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280. Explosives.

By Holmes, Fletcher B.

From [No Corporate Source data available \(1908\), US 875913 19080107](#), Language: Unavailable, Database: CAPLUS

All to explosives of nitrated starch and the following substances, respectively. Ammonium phosphate, ammonium arsenate 3%, ammonium chromate 3%, ammonium palmitate 2 to 5%, ammonium tartrate, ammonium pyrotartrate, triammonium citrate, oxamide, thiourea, 2 to 5%, a nitraniline, aniline oxalate, acetanilide, nitrotoluidine, toluidine oxalate, acetoluid and benzamide, mostly in the proportion of 2-5%, being sufficient to make the **nitrostarch** stable.

~0 Citings

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281. Nitrostarch explosive.

By Braunstein, Jesse B.

From [No Corporate Source data available \(1907\), US 869051 19071022](#), Language: Unavailable, Database: CAPLUS

Nitrostarch explosive. An explosive consisting of from 30 to 70% of **nitrostarch** and an added material consisting of finely divided iron and soda, the proportion of soda being approximately 2 to 10% by weight of the **nitrostarch** and soda.

~0 Citings

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282. Nitrostarch explosive.

By Braunstein, Jesse B.

From [No Corporate Source data available \(1907\), US 868837 19071022](#), Language: Unavailable, Database: CAPLUS

Nitrostarch explosive. An intimate mixture of from 30 to 70% of **nitrostarch**, and from 70 to 30% of an added material consisting of iron filings and ammonium nitrate, the ammonium nitrate constituting 5 to 20% by weight of the added material.

~1 Citing

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283. Nitrostarch explosive.

By Braunstein, Jesse B.

From [No Corporate Source data available \(1907\), US 868760 19071022](#), Language: Unavailable, Database: CAPLUS

Nitrostarch explosive. A process for making **nitrostarch** stable by treating it with a 10% borax solution and washing.

~0 Citings

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284. Explosive.

By Braunstein, Jesse B.

From [No Corporate Source data available \(1907\), US 868638 19071022](#), Language: Unavailable, Database: CAPLUS

A mixture of from 30 to 70% of **nitrostarch** and an added material consisting of finely divided iron and lime, the proportion of lime being 2 to 10% by weight of the **nitrostarch** and lime.

~0 Citings

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285. Explosive.

By Braunstein, Jesse B.

From [No Corporate Source data available \(1907\), US 868637 19071022](#), Language: Unavailable, Database: CAPLUS

Explosive. A mixture of from 30 to 70% of **nitrostarch** and 70 to 30% of iron filings.

~0 Citings

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286. Nitrostarch explosive.

By Braunstein, Jesse B.

From [No Corporate Source data available \(1907\), US 868636 19071022](#), Language: Unavailable, Database: CAPLUS

Nitrostarch explosive. An explosive consisting of **nitrostarch** and 3 to 5% of borax.

~0 Citings

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287. Colloidal material.

By Arnold, George E.; Fox, Albert S.; Scott, Alexander C.; Roberts, Henry E. U.

From [No Corporate Source data available \(1906\), GB 0603450 19060212](#), Language: Unavailable, Database: CAPLUS

A colloidal material produced by dissolving **nitrostarch**, with or without the addition of nitrocellulose, in a solvent such as wood spirit, and denitrating.

~0 Citings

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288. Nitrostarch, consisting.

By Arnold, George E.; Scott, Alexander C.; Roberts, Henry E. U.

From [No Corporate Source data available \(1906\), GB 0603449 19060210](#), Language: Unavailable, Database: CAPLUS

Process of manufacturing **nitrostarch**, consisting in adding a preparation of starch and nitric acid to sulphuric acid or waste acid from the nitrocellulose manufacture, so as to obtain the precipitate of **nitrostarch** in the form of a flaky mass, which is freed from acid by the action of water.

~0 Citings

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289. EXPLOSIVE COMPOUND

By Volney, Carl Walter

From [U.S. \(1887\), US 366281 A 18870712](#), Language: English, Database: CAPLUS

To all whom it may concern: Be it known that I, Carl Walter Volney, a citizen of the United States, residing at Toms River, in the county of Ocean and State of New Jersey, have invented certain new and useful Improvements in Explosive Compounds; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same. The main feature of my invention consists in the use of a gelatinous mass obtained by dissolving nitro-starch. in nitro-glycerine. The nitro-starch I prepare in the following manner: Starch is pulverized and dried, and then gradually stirred into a mixture of strong nitric and sulphuric acids, which is kept cool during the operation. Nitro starch separates in granulated masses, which are removed from the acid, well washed, so as to remove all traces of adhering acid, dried, and pulverized. The nitro-starch thus prepared is gradually dissolved in nitro-glycerine, which is kept at a temperature of 35 degrees centigrade, and, according to the quantities used of each, gelatinous substances of different degrees of consistence can be obtained.

~0 Citings

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290. Fundamentals on new capillaries inspired by photonic crystal fibers as optofluidic separation systems in CE

By Calcerrada Matias; Fernandez de la Ossa M Angeles; Roy Philippe; Gonzalez-Herraez Miguel; Garcia-Ruiz Carmen

From *Electrophoresis* (2015), 36(3), 433-40, Language: English, Database: MEDLINE

Two prototypes of microstructured capillaries (MSCs) were designed, manufactured, and used to carry out different experiments. MSC-1 consisted of six holes of $\approx 28 \mu\text{m}$ id whereas MSC-2 consisted of 85 holes of $\approx 7.7 \mu\text{m}$ id. A fundamental study on the hydrodynamic injection through a commercial CE equipment was conducted. Experimental times to flush specific volumes were approximately three times larger than the theoretical values. Then, the detection of starch was carried out by using the MSCs and conventional capillaries, and the electropherograms were compared on the basis of analytical parameters employed in CE. An improvement in peak asymmetry was obtained for the MSC-1 compared to the conventional capillaries. S/N was one order of magnitude increased with the MSC, improving ten times the sensitivity. Considering this advantage, the separation and detection of **nitrostar** was performed as a first application of the MSC-1. Minimal sample amounts of **nitrostar** (1.7 μg) were detected. Results present a real interest in forensics since this substance had not been previously detected through CE, leading to new investigations in the design of new capillaries capable of enhancing CE performance.

~0 Citings