1. A kind of preparation method of even coarse-grain hard alloy

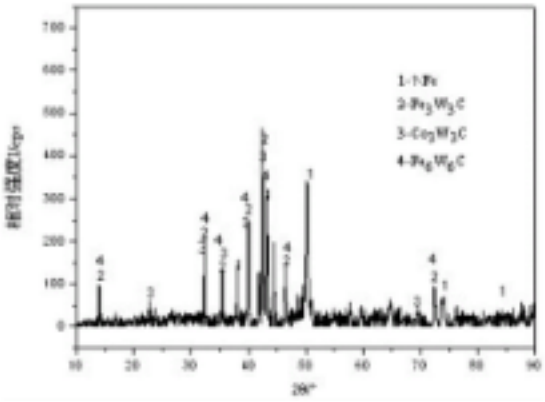
By Fu, Lianying; Peng, Ke; Zhao, Jixian
From Faming Zhuanli Shenqing (2015), CN 104388719 A 20150304, Language: Chinese, Database: CAPLUS

The invention provides the prepn. method of a kind of even coarse-grain hard alloy, includes mixing W_xCo_yC composite powder, tungsten carbide powder and cobalt powder, wet milling and drying, compacting, and sintering, by W_xCo_yC phase carrying out decompn. into newborn, extremely strong active WC and Co under enough carbon at high temp., and active extremely strong WC can have coalescence with more thin WC grain and grow, and active extremely strong Co also impels WC grain to grow up, and hard alloy fine grain is finally made to reduce or disappear, and mean grain size is improved, and alloy grain degree is even. The method provided by the invention is continued to use existing technol. condition to realize, and energy consumption is low, and holistic cost is low.

~0 Citings

2. Method for preparation of Co3W3C herringbone-shaped hard phase reinforced Fe-based wear-resistant coating

By Tao, Qing; Liu, Jianyang; Shen, Chengjin; Lai, Wei; Wang, Cong
From Faming Zhuanli Shenqing (2015), CN 104313570 A 20150128, Language: Chinese, Database: CAPLUS

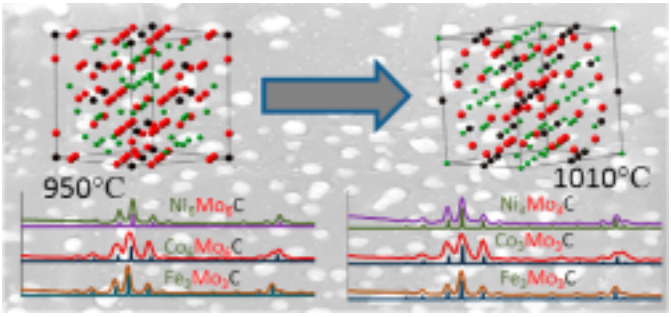


The invention belongs to the field of material surface wear-resistant coatings and prepn. methods. A Co_3W_3C herringbone-shaped hard phase reinforced Fe-based wear-resistant coating contains (by wt.) carbon 1.89-3.77, chromium 5.4-11.7, nickel 3.3-7.15, tungsten 28.81-57.83, cobalt 4.2-8.4, silicon 0.03-0.065, and iron in balance; and it is prepd. by pretreating substrate before plasma cladding by sanding to remove oxide layer; pretreating alloy powder by prepg. Fe-based WC mixed alloy powder from WC powder and Fe-based alloy powder, stirring, and regulating process parameters for plasma cladding; and prepg. a cladding layer with a specified thickness and thickness, and naturally cooling in air. The wear-resistant coating has the advantages of simple prepn. process, and high metallurgical bonding strength between the cladding layer and the substrate structure, thereby realizing the optimum performance matching between the cladding layer ceramic phase and the substrate; the herringbone-shaped hard phase Co_3W_3C has high hardness, plays the role of a framework in the friction process to reduce the wear of the substrate, and has excellent wear resistance; and the plasma cladding is convenient to operate, and can realize automatic operation, is used for prepg. a wear-resistant layer with dimensions of high precision, and can be widely applied in the surface modification of mech. parts.

~0 Citings

3. General Synthesis Method for Bimetallic Carbides of Group VIIIA First Row Transition Metals with Molybdenum and Tungsten

By Regmi, Yagya N.; Leonard, Brian M.
From Chemistry of Materials (2014), 26(8), 2609-2616. Language: English, Database: CAPLUS, DOI:10.1021/cm500076v



We have established a general method for the synthesis of two different stoichiometries of bimetallic carbides for each of the first row transition metals (TM) of Group VIIIA with tungsten and molybdenum. A dispersion of bimetallic carbide particles in a network of carbon was achieved using excess carbon during the carbothermic redn. process. An investigation into the redn. process revealed bimetallic carbide formation proceeding via stepwise redn. of oxide precursors to metals. The low carbon content phase $TM_6(Mo/W)_6C$ and the high carbon content phase $TM_3(Mo/W)_3C$ form within a temp. window of 60 °C which emphasizes the need for careful control over reaction conditions in order to form the desired phase pure product.

~4 Citings

4. A Co3W3C promoted Pd catalyst exhibiting competitive performance over Pt/C catalysts towards the oxygen reduction reaction

By Li, Zesheng; Ji, Shan; Pollet, Bruno G.; Shen, Pei Kang
From Chemical Communications (Cambridge, United Kingdom) (2014), 50(5), 566-568. Language: English, Database: CAPLUS, DOI:10.1039/C3CC48240E

A novel Co_3W_3C promoted Pd electrocatalyst shows competitive performance over Pt/C towards the O redn. reaction in acidic media.

~18 Citings

5. Corrosion resistant tungsten carbide-η phase cemented carbide and its manufacture

By Song, Xiaoyan; Wang, Haibin; Guo, Guangsheng
From Faming Zhuanli Shenqing (2013), CN 103184382 A 20130703, Language: Chinese, Database: CAPLUS

The cemented carbide comprises tungsten carbide and 10-40 wt.% η (WC-η), where the η phase is Co_3W_3C or Co_6W_6C. The cemented carbide is manufd. by mixing blue tungsten oxide, cobalt oxide and carbon black, ball-milling using abs. ethanol as medium for 10-20 h, drying, reacting in a vacuum furnace at 800-1,000°C for 0.5-1.5 h to obtain WC-η composite powder, adding polyethylene glycol, pressing into blank, sintering at 1,380-1,420°C for 0.5-1.5 h, and cooling to room temp.

~0 Citings

6. Tools comprising cubic boron nitride-based ceramics at the point of action

By Kukino, Satoru; Okamura, Katsumi; Fukaya, Tomohiro
From Jpn. Kokai Tokkyo Koho (2011), JP 2011189421 A 20110929, Language: Japanese, Database: CAPLUS

The title ceramics show thermal cond. ≤70 W/m·K and consist of (A) ≥60 and <99 vol.% cubic boron nitride, (B) thermal insulator phases contg. 1-20 wt.% (to ceramics total wt.) of <100 nm-av.-diam. first compds. which are made of first elements selected from Al, Si, Ti, and Zr, and second elements selected from N, C, O, and B, and (C) binder phases. The thermal insulator phases may further contain second compds. made of W and/or Re and ≥1 elements selected from N, C, O, and B. The tools achieve both low thermal cond. and high hardness.

~1 Citing

7. Tungsten-based Carbides as Anode for Intermediate-Temperature Fuel Cells

By Muroyama, Hiroki; Katsukawa, Koji; Matsui, Toshiaki; Eguchi, Koichi
From Journal of the Electrochemical Society (2011), 158(9), B1072-B1075. Language: English, Database: CAPLUS, DOI:10.1149/1.3604780

W carbides were prepd. from ammonium paratungstate via temp.-programmed carburization under flowing a gaseous mixt. of CH_4/H_2 to employ as anode catalysts in fuel cells consisting of CsH_2PO_4/SiP_2O_7-based composite electrolyte operative at 200°. The resulting materials were characterized by x-ray diffraction and XPS. The heat-treatment at high temps. promoted the redn. and carburization of W component. The single phase of WC was obsd. for the samples subjected to the carburization at and >800°. The single cell employing the catalyst prepd. at 850° attained the best performance. The anode material contg. the metallic W exhibited low stability under the power generation condition. With Ni or Co additives, the carburization of W species was initiated at low temps. The samples with the additives heat-treated at high temps. were composed of several W carbides including WC. When these samples were applied as anode catalysts, the additive species lowered the cell performance. The WC phase was the most effective electrocatalyst for the H oxidn.

~3 Citings

8. Characterization of electro-spark deposition WC-15Co coating on cast steel roll

By Wang, Jian-sheng; Meng, Hui-min; Yu, Hong-ying; Sun, Dong-bai; Fan, Zi-shuan
From Cailiao Gongcheng (2011), (2), 87-91, 96. Language: Chinese, Database: CAPLUS

Using a new type electro-spark deposition, WC-15Co electrode was deposited on the surface of cast steel roll by electro-sparking deposition (ESD). The microstructure and wear resistance of the coating were investigated. The results show that the coating consists of Fe_3W_3C, Co_3W_3C, Fe_2C and Fe phases. The coating is well metallurgical bonded with cast steel roll substrate. The Fe_3W_3C, Co_3W_3C and Fe_2C phases distribute in the coating dispersedly, with the extra-fine structure for the phases in some area. The av. hardness of the coating is 660HV. The coating has good wear and the av. wear resistance rate is 2.7 of that of the cast steel substrate. The wear mechanism is adhesion wear, fatigue wear, oxidization wear and abrasive wear. Fine hard phases distributed in the coating dispersedly are the main factors leading the high hardness and wear resistance of the coating.

~0 Citings

9. Method of producing nanodispersed hard-alloy compositions based on double tungsten carbide and cobalt

By Kushkhov, Kh. B.; Adamokova, M. N.; Kvashin, V. A.; Kardanov, A. L.
From Russ. (2009), RU 2372420 C1 20091110, Language: Russian, Database: CAPLUS

The invention relates to electrochem. synthesis of refractory tungsten compds. and can be used for producing nanodispersed hard-alloy compns. based on tungsten carbide and cobalt, with high m.ps., hardness, strength, elasticity, chem. inertness. A melt, contg., mol.%: lithium tungstate 30.0 to 40.0, cobalt tungstate 2.5 to 5.0, lithium carbonate 15.0 to 20.0, sodium tungstate, the rest, undergoes electrolysis in open cells in galvanostatic mode with cathode c.d. ranging from 2.5 to 7.5 A/cm^2. The method permits to obtain power with particles size ranging from 50 to 500 nm, to double rate of synthesis of desired product, simplification of the process.

~0 Citings

10. Methods for making carbide-metal nanocomposite powders

By Han, Gilsoo; Ryu, Taegong; Mena, Manolete; Sohn, Hong Yong; Fang, Zhigang Zak
From PCT Int. Appl. (2007), WO 2007149541 A2 20071227, Language: English, Database: CAPLUS

This chem. vapor synthesis process was designed so that a metal carbide precursor and a secondary metal precursor are sep. or together fed into each evaporator in a reactor by specially designed precursor feeders, either simultaneously or sequentially. The redn. and carburization of the vaporized precursors by gaseous mixts. produces carbide-metal nanocomposite powders. The product can be a very uniform mixt. of the constituent powders or a uniform agglomerate, which is important to ensure a high quality of bulk cemented metal carbide product after consolidation and sintering. These nanocomposite powders can be readily characterized using XRD, carbon analyzer and TEM.

~1 Citing

11. A comparative study of the catalytic performance of Co-Mo and Co(Ni)-W carbide catalysts in the hydrodenitrogenation (HDN) reaction of pyridine

By Al-Megren, Hamid A.; Gonzalez-Cortes, Sergio L.; Xiao, Tiancun; Green, Malcolm L. H.
From Applied Catalysis, A: General (2007), 329, 36-45. Language: English, Database: CAPLUS, DOI:10.1016/j.apcata.2007.06.013

In this contribution the HDN catalytic behavior of Co-Mo carbide catalysts and Co(Ni)-W carbide catalysts is compared to establish a rational effect of cobalt (or nickel) over Mo and W carbide HDN catalysts. The bimetallic and trimetallic catalysts were characterized by using elemental anal., XRD, IR spectroscopy, Raman spectroscopy, thermo-gravimetric anal. and measurements of BET sp. surface area. The catalytic performance was evaluated in a continuous flow reactor using hydrodenitrogenation of pyridine as model reaction. The incorporation of cobalt onto the structure of Mo_2C reached an optimal Co/Mo ratio of 0.43 (i.e. $Co_4Mo_6C_x$ catalyst), whose HDN activity and stability was markedly higher than industrial catalysts (i.e. $CoMoS/Al_2O_3$ and $NiMoS/Al_2O_3$). Higher molar ratios facilitated the segregation of promoter. This was reflected in a poor catalytic stability not only on Co-Mo carbide catalysts, but also on the Co(Ni)-W carbide catalysts. The $CoWC_x$ bimetallic catalyst was more active in the steady state than Ni-contg. catalysts. Two modes of pyridine adsorption may occur in the HDN reaction, the end-on mode appears to be the more favorable at low temps. whereas the side-on mode is more favorable at higher temps. Further increasing reaction temp. over 400° increases the hydrogenolysis reaction so more methane is produced, while the percentage of other hydrocarbon products decreased.

~17 Citings

12. Formation of twinned WC grains during carbonization of Eta phase (W3Co3C)

By Kim, Jong-Dae; Lee, Kern-Woo; Lee, Joo-Wan; Sharon, Moshe; Kang, Suk-Joong L.
From Materials Science Forum (2007), 534-536(Pt. 2, Progress in Powder Metallurgy), 1189-1192. Language: English, Database: CAPLUS, DOI:10.4028/www.scientific.net/MSF.534-536.1189

Twinned WC grains are sometimes obsd. in WC powder and sintered WC-Co alloys. The present study has studied the formation of twinned WC grains during carburization of an Eta phase. Eta grains were carburized at 700-1450° for 1 min to 9 h. Twinned WC grains formed during the carburization. Crystallog. characterization of the formed twins were made using SEM and TEM. The formation of twins is affected by the carbon activity during carburization. The twins formed under high carbon activities while no twins formed under low carbon activities. Two kinds of twins with different orientations were obsd. The present exptl. observation suggests that the twins formed via 2-dimensional nucleation and layer-by-layer growth on small WC clusters under high supersatn. and high driving force for the growth of WC grains.

~1 Citing

13. Fine porous sintered bodies containing double carbides and their manufacture

By Iwasaki, Masahiro; Yanagida, Hidefumi; Ikebe, Masaaki
From Jpn. Kokai Tokkyo Koho (2006), JP 2006131434 A 20060525, Language: Japanese, Database: CAPLUS

The title sintered bodies contain ≥1 double carbides represented as M_6W_6C, M_3W_3C, M_2W_4C, or $M_3W_9C_4$ (M = Fe-Group metals) partially or in whole bodies and have dendritic three-dimensional network structure. The manuf. process comprises following steps; compacting mixts. contg. WC powder and Fe-Group metal powder showing three-phase coexisting area contg. double carbides in phase diagram; and then diffusion heat treating at 600-1300° for 2-5 h. The sintered bodies provide high hardness and wear resistance.

~0 Citings

14. Bimetallic carbide catalysts for methane reforming

By Shao, Huifeng; Ma, Wenping; Kugler, Edwin L.; Dadyburjor, Dady B.
From AIChE Annual Meeting, Conference Proceedings, Austin, TX, United States, Nov. 7-12, 2004 (2004), 015D/1-015D/4. Language: English, Database: CAPLUS

The effect of CO_2/CO ratio in the reducing stream on Co-W carbide catalyst prepn. for dry reforming of methane was studied. It was suggested that CO_2-CO mixt. flowing over catalyst precursor leaves traces of oxygen on the surface of the materials. At low temps., less than 850 °C, this surface oxygen is converted to oxides, rendering the material catalytically ineffective. At sufficiently high temps., methane can react with the surface oxides or the surface oxygen and metallic carbide to form Co, WC and carbon, which constitute the active phase. Once these materials are formed, they are stable even at lower temps.

~0 Citings

15. Relevance of the Co1-xNixWO4 wolframite-type mixed oxide compositions on the synthesis and catalytic properties of W-based carbides

By Gonzalez-Cortes, Sergio L.; Xiao, Tian-Cun; Costa, Pedro M. F. J.; Rodulfo-Baechler, Serbia M. A.; Green, Malcolm L. H.
From Journal of Molecular Catalysis A: Chemical (2005), 238(1-2), 127-134. Language: English, Database: CAPLUS, DOI:10.1016/j.molcata.2005.05.012

A series of wolframite-type oxides ($Co_{1-x}Ni_xWO_4$) with various compns. was prepd. by urea-matrix combustion method and subsequently carburized using a temp.-programmed reaction (1°C min^{-1}) under a mixt. of 10 vol. % C_2H_6/H_2, from room temp. to 700°C, to obtain a mixed Co, Ni and W carbide catalysts. The catalytic performance was evaluated in a continuous flow reactor using hydrodenitrogenation of pyridine as model reaction. The wolframite-type oxides and the carbide catalysts pre- and post-HDN reaction were characterized using elemental anal., X-ray diffraction (XRD), laser Raman spectroscopy, thermogravimetric anal. (TGA), differential scanning calorimetry (DSC), transmission electron microscopy (TEM) and BET surface area measurements. Urea-matrix combustion method is a convenient tool to prep. highly pure wolframite-type oxides, whose compn. affects strongly the W-based carbide phase distribution and the HDN catalytic behavior. At Ni compns. lower than Co contents the formation of Co_3W_3C and β-W_2C carbides is favored, whereas at Ni compns. greater than those of Co the main phases were Ni and α-WC. At intermediate compn. ($Co_{0.5}Ni_{0.5}WC_x$) bimetallic and monometallic carbides were formed. The $CoWC_x$ bimetallic catalyst showed greater activity in the steady state than Ni-contg. catalysts. The HDN active phase present in $CoWC_x$ is different than that present in the Ni-contg. catalysts, i.e., carbon-metal bond strength of the bimetallic carbide, for the former, and metal nickel or weak Ni-C bond, for the latter, play a very important role in the catalytic process.

~13 Citings

16. Characterization and catalytic performance of Co, Ni and W trimetallic carbides

By Gonzalez-Cortes, Sergio L.; Xiao, Tian-Cun; York, Andrew P. E.; Ma, Ding; Al-Megren, Hamid; Green, Malcolm L. H.
From Reaction Kinetics and Catalysis Letters (2005), 84(1), 21-28. Language: English, Database: CAPLUS, DOI:10.1007/s11144-005-0186-5

New wolframite-type oxides ($Co_{1-x}Ni_xWO_4$) with various compns. have been prepd. by a combustion method and carburized using a temp.-programmed reaction. Catalytic performance was evaluated in a continuous flow reactor using pyridine hydrodenitrogenation (HDN) as the model reaction. The carbide phase compn. is markedly affected by the at. ratio (i.e., Ni / Ni + Co). The mixed Co, Ni and W carbides are active catalysts for pyridine HDN reaction; however, they undergo deactivation due to graphitic carbon deposition and segregation.

~1 Citing

17. High-temperature electrochemical synthesis of carbon-containing inorganic compounds under excessive carbon dioxide pressure

By Novoselova, I. A.; Volkov, S. V.; Oliinyk, N. F.; Shapoval, V. I.
From Journal of Mining and Metallurgy, Section B: Metallurgy (2003), 39(1-2), 281-293. Language: English, Database: CAPLUS, DOI:10.2298/JMMB0302281N

Features of the electroredn. of CO_2 dissolved in the equimolar melt of Na and K chlorides under excessive pressure of up to 1.7 MPa were studied by cyclic voltammetry over a wide polarization rate range. The electrode process occurs in 2 stages at sweep rates of ≤0.1 V s^{-1}, and its mechanism is is suggested. The cathodic product is polycryst. graphite. Systems and conditions for producing 2- and 3-component refractory metal carbides using CO_2 as a synthesis component were selected.

~4 Citings

18. Mechanistic investigation of the field-activated combustion synthesis of tungsten carbide with or without cobalt added

By Jiang, Guojian; Zhuang, Hanrui; Li, Wenlan
From Combustion and Flame (2003), 135(1-2), 113-121. Language: English, Database: CAPLUS, DOI:10.1016/S0010-2180(03)00153-6

The activation of self-propagating combustion reactions in the system of tungsten and carbon and its composites with cobalt as additive was achieved using an elec. field. The reaction mechanism of Field-Activated Combustion Synthesis (FACS) of tungsten carbide and its composites has been investigated using the quenching sample method. By turning off the elec. field during FACS, a series of combustion products with different phase compns. has been obtained. Layer to layer X-ray and microscopic analyses of these combustion products across the quenched combustion front suggest that the synthesis of WC involves the solid-phase diffusion of carbon into a carbide layer. W_2C is the intermediate phase between WC and the reactants (W and C). A metallic additive produces liq. phase and accelerates the diffusion of the solid reactants (W and C); this facilitates the formation of W_2C and the transformation of W_2C to WC. Moreover, molten Co reacts with W and W_2C to form mixed compds. of type $W_xC_yCo_z$.

~4 Citings

19. Investigation on electrode arc welding of WC-Co cemented carbide

By Ren, Dengyi; Ren, Wa; Qin, Mingjun
From Jixie Gongcheng Xuebao (2001), 37(9), 71-74, 79. Language: Chinese, Database: CAPLUS, DOI:10.3901/JME.2001.09.071

The electrode is made of pure Ni and coating with lots of graphite, which filler metal has well wetting quality and liq. inter-dissoln. with WC-Co cemented carbide. The analyses of TEM, SEM, EDAX show that the bond is made up of solid soln. of W, Co and spherical graphite in the matrix of Ni. There are some new brittle phase of Co_3W_3C, WC_{1-x} formed during welding metallurgy. Most of them are annexed by spherical graphite and only a few of those scattered at the sub-boundary of the matrix. Eventually, the WC-Co cemented carbide has favorable fusion welding of arc welding on study condition.

~0 Citings

20. Preparation of tungsten cobalt carbides and oxide via an organometallic heterobimetallic complex as a single-source precursor

By Shyu, Shin-Guang; Wu, Chun-Seng; Sung, Yung-Sheng; Chi, Kai-Ming
From Journal of the American Ceramic Society (1999), 82(6), 1436-1440. Language: English, Database: CAPLUS

Tungsten cobalt carbides and oxides can be obtained via a single-step pyrolysis of an organometallic single-source precursor $(\eta^5\text{-}C_5H_5)(CO)_3WCo(CO)_4$ (I). Pyrolysis of I in an oxygen atm. produced $WCoO_4$ at 600°C. In a nitrogen atm. W_6Co_6C was obtained when I was heated at 700°C. However, under vacuum, the pyrolysis of I produced the other phase, W_3Co_3C, at 700°C. Both carbides were contaminated with graphitic carbon, as indicated by their ESCA spectra. Powders that were obtained by using these procedures had particle sizes of up to 100 μm. Microg. showed that the particles were porous, which indicated outgassing during pyrolysis.

~1 Citing

21. Powder for manufacture of cermet chip and manufacture of the powder from used cermet chip

By Kobayashi, Masaki; Kitada, Hiroshi
From Jpn. Kokai Tokkyo Koho (1999), JP 11158569 A 19990615, Language: Japanese, Database: CAPLUS

The powder mainly contains a hard phase-forming material composed of 10-80 wt.% mixed carbide contg. Co and/or Ni, W, and C and bal. Ti carbide, nitride, and/or carbonitride. The manufg. method involves the following steps: (1) pulverizing cermet chips composed of a Ti-based carbide, nitride, and/or carbonitride as hard phase and Co and/or Ni as binder phase to form coarse grains, (2) adding W into the coarse grains, and (3) heating the obtained mixt. to form the mixed carbide. Used or inferior cermet chips can be recycled as the powder with low impurities, and cermet chips obtained from the powder have toughness and hardness.

~0 Citings

22. Wear- and corrosion-resistant hard sintered alloys containing tungsten carbide and having low friction coefficient

By Kobayashi, Masaki; Kitamura, Kozo
From Jpn. Kokai Tokkyo Koho (1998), JP 10130771 A 19980519, Language: Japanese, Database: CAPLUS

The title alloys contain (A) 3-15 wt.% of binding phases mainly contg. W and Co and/or Ni, (B) ≤50 wt.% of dispersion phases of carbidec compds. contg. W and Co and/or Ni, and (C) balance WC and inevitable impurities. In the alloys, ≤30 wt.% of hard phases of ≥1 compds. selected from carbides, nitrides, and carbonitrides of Group IVB, VB, and VIB elements having cubic structure may be included. The binding phases may contain ≤15 wt.% (to the binding phases) of Cr and/or Mo. The dispersion phases may be carbide compds. contg. W, Co and/or Ni, and Cr and/or Mo. By including metal mixed carbides such as Co_3W_3C and Ni_2W_4C in cemented carbides and by including W in the binding phases, corrosion- and wear resistance are remarkably improved and the alloys are suitable for nozzles, mech. seals, bearings, injection molding dies, etc.

~0 Citings

23. Electric conductor rolls for electroplating showing high corrosion and wear resistance and their preparation

By Harada, Yoshio; Hara, Kenichi; Yamamoto, Atsushi
From Jpn. Kokai Tokkyo Koho (1998), JP 10110252 A 19980428, Language: Japanese, Database: CAPLUS

The title conductor rolls comprise metal rolls coated with thermally sprayed cermets which contain mixed carbides contg. WC and Cr_3C_2, and ≥1 selected from Cr, Cr-Co alloys, and Cr-Ni alloys. The cermets are formed by thermally spraying powders of particle size 3-60 μm by using flame or detonation energy of combustion gases. The formed cermet coatings show low elec. resistance and high resistance to corrosion in acidic electroplating baths.

~2 Citings

24. Elevated-temperature toughness and hardness of a hot-pressed Al2O3-WC-Co composite

By Tai, Weon-Pil; Watanabe, Tadahiko
From Journal of the American Ceramic Society (1998), 81(1), 257-259. Language: English, Database: CAPLUS

The fracture toughness and hardness of an Al_2O_3·80WC·10Co composite were investigated in air at elevated temps. The primary phases in the composite were WC, α-Al_2O_3, and Co_3W_3C, but small amts. of Co and C (graphite) appeared at elevated temps., related to decompn. of the Co_3W_3C phase. The fracture toughness of the composite was const. with increasing temp. up to 330°C and then increased at 400-550°C. A transition of brittle to ductile behavior occurred at about 700°C. The enhancement of fracture toughness at elevated temp. is attributed to the decompn. of Co_3W_3C to Co and C, and enhanced crack deflection and bridging. Decreases in hardness with increasing temp. are attributed to the softening of WC matrix and decompn. of Co_3W_3C.

~7 Citings

25. Electrochemical synthesis of intermetallic compounds and complex carbides based on molybdenum(tungsten) and cobalt(nickel)

By Novoselova, I. A.; Malyshev, V. V.; Kushkhov, Kh. B.; Shapoval, V. I.
From Poroshkovaya Metallurgiya (Kiev) (1996), (3-4), 1-6. Language: Russian, Database: CAPLUS

Systems for combining Mo(W), Ni(Co) and C electrodeposition processes in ionic melts (KCl-NaCl) were selected. Conditions for depositing Mo(W)-Ni(Co) intermetallics and double carbides based on them were found. On the whole, the electrochem.-synthesis is detd. by the following interrelated parameters: partial-current-ratio of reacting components, energetics of interaction between them, the occurrence of simultaneous reactions between components.

~0 Citings

26. Recycling of superhard sintered alloy compositions and preparation of the alloys

By Kobayashi, Masaki; Hojo, Nobuo
From Jpn. Kokai Tokkyo Koho (1996), JP 08120352 A 19960514, Language: Japanese, Database: CAPLUS

Superhard sintered alloys (compns.) are heated in oxidizing atm. at ≥1000° to generate ≥20 wt.% of mixed carbides contg. C, W, and Co and/or Ni; and then pulverized for recycling. Superhard sintered alloys (compns.) are mixed with ≥1 additives selected from Co, Ni, W, their oxides, and precursors; heated in inert atm. at ≥1000° to generate the mixed carbides, and then pulverized for recycling. The pulverized powders may be mixed with C and/or graphite, and then sintered in nonoxidizing atm. at 1200-1600° to give superhard alloys contg. planar WC crystals. The recycled alloys show high strength, toughness, and wear resistance.

~0 Citings

27. Effect of thermal spray process selection on the tribological performance of WC-Co and Al2O3-TiO2 coatings

By Naerheim, Y.; Coddet, C.; Droit, P.
Edited By:Sudarshan, T. S.; Jeandin, Michel
From Surface Modification Technologies VIII, Proceedings of the International Conference on Surface Modification Technologies, 8th, Nice, Sept. 26-28, 1994 (1995), 734-46. Language: English, Database: CAPLUS

VPS, HVOF and APS were used to deposit WC-Co, and APS to deposit Al_2O_3-TiO_2 coatings on AISI 4130 steel to study the effect of process selection on the friction and wear of the coatings under dry sliding conditions in air. The VPS WC-Co, which had a cobalt matrix with few brittle eta carbides (Co_3W_3C and Co_6W_6C), small and evenly dispersed WC, and high residual compressive stress, was most abrasive to Al_2O_3-TiO_2.

~3 Citings

28. Manufacture of superhard alloys containing plate-like tungsten carbide

By Kobayashi, Masaki; Kitada, Hiroshi
From Jpn. Kokai Tokkyo Koho (1995), JP 07292426 A 19951107, Language: Japanese, Database: CAPLUS

C and/or C precursor; ≥1 binder phase-former selected from Co, Ni, Cr, and their precursors; and balance W and optionally W carbide are mixed, molded, and sintered in vacuum or in gaseous atm. to form superhard alloys consisting of 2-30% of Co-, Ni-, and/or Cr-based binder phase and balance W carbide by 2-step process of (1) formation of composite carbides of W and Co, Ni, and/or Cr and (2) formation of plate-like WC from the composite carbides. Optionally, ≥1 of carbides, nitrides, oxides, or their mutual solid solns. of group IVB, VB, and VIB metals may be added during the mixing process. The alloys have high hardness, tenacity, and strength, and are resistant to wear and chipping.

~0 Citings

29. Comparison of plasma and detonation sprayed tungsten carbide-cobalt coatings

By Kuhanen, P. L.; Kettunen, P. O.
From DVS Berichte (1993), 152, 100-2. Language: English, Database: CAPLUS

WC-Co coatings deposited by detonation spraying give the best properties, higher hardness, lower porosity and better wear resistance than those deposited by atm. plasma spraying. The increase in wear resistances is attributed to higher hardness values and lower porosity plus a fine distribution of carbide particles in the coating. The hardness of detonation-sprayed coatings was generally higher than that of an equiv. coating produced by plasma spraying. The particle size in plasma-sprayed coatings was coarser, and the pores are larger, although the difference was only 1%. Different phases in coatings deposited by plasma and detonation spraying techniques was detected. Co_3W_3C was present in the plasma-sprayed coatings and starting powder. The most homogeneous coating was achieved by using the detonation gun technique and starting powder which had no complex phases. In addn., the coating generally had the better properties.

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