1. Screening of metal oxides and metal sulfides as sorbents for elemental mercury at elevated temperatures

By Couling, David J.; Nguyen, Hoang V.; Green, William H.
From Fuel (2012), 97, 783-795. Language: English, Database: CAPLUS, DOI:10.1016/j.fuel.2012.03.011

A tech. challenge for the implementation of Integrated Gasification Combined Cycle (IGCC) coal power plants is detg. a method to efficiently capture the pollutants present in coal-derived syngas. One such method is to capture the pollutants at elevated temps. to decrease the parasitic energy costs assocd. with their capture. Elemental Hg is difficult to capture because it is present in low concns. and is relatively inert. To overcome tech. and economic impediments to studying potential materials exptl., here the authors present an alternative approach in which the authors screen these materials using d. functional theory. The authors compute the thermochem. for 23 materials reacting with Hg to evaluate their efficacy for Hg capture. The authors also compute the thermochem. of these materials reacting with H_2, a major component of syngas. Using these calcns. the authors were able to obtain ests. for the thermochem. of 21 metal oxide and metal sulfide compds., 17 of them contg. Hg, where no exptl. data are available. The authors predict several sorbent materials such as BaO_2, CrO_2, and Na_2O_2 to be effective for Hg capture at elevated temps. but unusable in syngas because of their reactivity with H_2. These materials may instead be effective for Hg capture from flue gas. The authors also predict that the selectivity of K_2S_2 for Hg over H_2 is favorable, even at the IGCC conditions. Finally, the authors exptl. evaluate the Hg adsorption ability of K_2S_2, BaO_2, and CrO_2 to test the theor. predictions. CrO_2 was also evaluated for its potential to H_2 redn. CrO_2 is an effective high-temp. sorbent for Hg in an inert carrier gas but is not stable in H_2 streams, which agrees well with the theor. calcns.

~12 Citings

2. Antimony oxide mercury

By Li, Hailong
From Faming Zhuanli Shenqing (2010), CN 101857271 A 20101013, Language: Chinese, Database: CAPLUS

The antimony oxide mercury is formulated by $Sb_2O_7Hg_2$, is a red metal liq., has high d. and can be used in medicine, military affairs, high-tech fields, etc.

~0 Citings

3. X-ray powder diffraction studies and bond-valence analysis of Hg2Sb2O7

By Sidey, V. I.; Milyan, P. M.; Semrad, O. O.; Solomon, A. M.
From Journal of Alloys and Compounds (2008), 457(1-2), 480-484. Language: English, Database: CAPLUS, DOI:10.1016/j.jallcom.2007.03.011

The crystal structure of $Hg_2Sb_2O_7$ was refined using x-ray powder diffraction technique. $Hg_2Sb_2O_7$ crystallizes in the cubic pyrochlore structure type, space group $Fd\bar{3}m$, with the lattice parameter a = 10.3525(5) Å, Z = 8, D_c = 9.060(1) g/cm^3. The Rietveld refinement procedure was stopped when the intensity residual R_B = 3.25% had been reached. In the bond-valence anal. of the crystal structure of $Hg_2Sb_2O_7$, the values of the bond-valence parameters reported for the Sb^{5+}/O^{2-} ion pair were found to be doubtful. Using the new calcn. scheme, the improved bond-valence parameters for the Sb^{5+}/O^{2-} ion pair (r_0 = 1.908 Å and b = 0.409 Å) were derived from the crystal structure of Sb_2O_5.

~13 Citings

4. Mechanochemical synthesis of Hg2Sb2O7 from simple Hg and Sb oxides

By Kulebakin, V. G.; Fedorov, V. A.; Nefedov, A. A.; Erofeev, F. A.
From Izvestiya Vysshikh Uchebnykh Zavedenii, Khimiya i Khimicheskaya Tekhnologiya (2006), 49(10), 39-42.
Language: Russian, Database: CAPLUS

The results of investigation are presented of the mechanosynthesis of a complex oxide of Hg and Sb on the basis of cryst. HgO and amorphous Sb_2O_5 during 5-120 s only. These are of practical importance in prodn. of nanocomposites and ceramic materials. For these purposes use can be effectively made of a cyclic action planetary mill M-3 with the vol. of barrels 600 sm^3.

~0 Citings

5. Phase equilibria in the system HgO-Sb2O3

By Milyan, P. M.; Semrad, E. E.
From Fizika i Khimiya Tverdogo Tila (2001), 2(1), 95-98. Language: Ukrainian, Database: CAPLUS

Using X-ray diffraction techniques, redox reaction is obsd. in HgO-Sb_2O_3 system. The corresponding phase diagram points on formation of Sb_2O_5, $Hg_2Sb_2O_7$, and $HgSb_2O_6$.

~2 Citings

6. Structure of mechanochemical reaction products in the systems CdO(HgO)-Sb2O5(Sb2O3)

By Zyryanov, V. V.
From Inorganic Materials (Translation of Neorganicheskie Materialy) (2001), 37(11), 1138-1148. Language: English, Database: CAPLUS

The mechanochem. reactions induced in 2CdO(HgO) + Sb_2O_5(Sb_2O_3) oxide mixts. by high-energy ball milling were studied by x-ray diffraction. New pyrochlore and fluorite phases were found to be formed at a high rate. Using thermal anal., the temp. ranges of the structural and chem. transformations in the reaction products were detd. and their compns. were refined. The synthesized materials are characterized by disordered structures, intermediate valence states, high vacancy concns., and deficit of the harder component, in line with the earlier proposed model for the reaction zone. The relatively high thermal stability of the metastable compds. suggests that mechanochem. ceramic processing can be used to fabricate unique ceramic materials and nanocomposites.

~7 Citings

7. Red mercury. What is it?

By Hasenpusch, Wolfgang
From Galvanotechnik (1998), 89(3), 748-749. Language: German, Database: CAPLUS

A brief review without refs. on recent knowledge about red Hg was briefly described and a specification including some properties (e.g. ρ = 20.20 g/cm^3 (sic!)) was discussed. In the latter red Hg is considered as $Hg_2Sb_2O_7$.

~0 Citings

8. Manufacture of mercuric pyroantimonate

By Shirvinskij, Aleksej E.
From Russ. (1995), RU 2036149 C1 19950527, Language: Russian, Database: CAPLUS

Title only translated.

~1 Citing

9. X-ray photoelectron study of mercury antimony oxide (Hg2Sb2O7)

By Teterin, Yu. A.; Sosul'nikov, M. I.; Shustov, L. D.; Kobrin, I. K.
From Doklady Akademii Nauk (1992), 325(3), 544-8 [Phys. Chem.]. Language: Russian, Database: CAPLUS

The compd. $Hg_2Sb_2O_7$ was synthesized from the oxides Sb_2O_5 and HgO to study its electronic structure by XPS. The phase anal. study was made in an x-ray diffractometer using the Cu K_α-x-rays. The x-ray photoelectron spectra were obtained on an electrostatic spectrometer using monochromatized excitation x-ray Al $K_{\alpha,1,2}$ (1486.6 eV)-radiation and a low-energy e gun at a vacuum of 1.3×10^{-7} Pa at room temp. The deep-lying Sb 5s-electrons effectively participate in the chem. bonding. For $Hg_2Sb_2O_7$, an anal. of the structure in the energy region of the Sb 5s-electrons is difficult owing to its overlap with the line of Hg 5d-electrons. Nevertheless, a detailed study of the structure in this region of the $Hg_2Sb_2O_7$ spectra can be made by using the given theor. calcns.

~0 Citings

10. New ternary oxide of mercury with the pyrochlore structure

By Sleight, A. W.
From Inorganic Chemistry (1968), 7(9), 1704-8. Language: English, Database: CAPLUS, DOI:10.1021/ic50067a003

Three new ternary oxide of Hg-$Hg_2Nb_2O_7$, $Hg_2Ta_2O_7$, and $Hg_2Sb_2O_7$-have been prepd. and characterized. All three have the cubic pyrochlore structure with cell edges of 10.453, 10.452, and 10.349 A., resp. The structure of $Hg_2Nb_2O_7$ was refined by leastsqs. to an R of 0.027 using 26 reflections collected with a powder diffractometer. The pyrochlore structure may be visualized as two interpenetrating networks, one network being identical with one of the two interpenetrating networks in Cu_2O. 18 references.

~78 Citings