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Abstracts of Forthcoming Articles

A Study of Infrared Absorption in the Oxidation of Zinc-Substituted Magnetites to Defect Phase γ and Hematite. B. GILLOT,* R. M. BENLOUCIF, AND A. ROUSSET, Laboratoire de Recherches sur la Réactivité des Solides, Faculte des Sciences Mirande, B.P. 138, 21004 Dijon Cedéx, France. The effect of substitution extent on formation of superstructure–ordered vacancies in zinc-substituted lacunar spinels of type $Zn_x^{2+}Fe_{1-x}^{3+})_A(Fe_{(5+x)/3}^{3+}\square_{(1-x)/3})_BO_4^{2-}$ was investigated using ir spectrometry. Only those lacunar phases whose substitution extent x is less than about 0.3 show a vacancy ordering on octahedral sites. In addition, referring to the disappearance of the 635-cm^{-1} absorption band, which is characteristic of these lacunar spinels, we show that the transformation temperature of the γ phases into αFe_2O_3 increases with zinc substitution extent. For the α phases obtained at 700°C we have found a linear variation between the intensity difference of the 390- and 450-cm^{-1} absorption bands and the percentage of αFe_2O_3.

Donnees cristallographiques sur une nouvelle serie de manganites mixte de terre rare et d'alcalino-terreux. M. N. DESCHIZEAUX CHERUY* AND J. C. JOUBERT, Laboratoire de Matériaux, Section Génie Physique, ENS-IEG, Domaine Universitaire B.P. 46, 38402 St. Martin d'Heres, France. The synthesis of two new series of oxides: $BaLn_2Mn_2O_7$ and $SrLn_2Fe_2O_7$, where Ln is a rare earth, was performed. The experimental conditions are given along with some crystal data. The diffraction patterns show a close resemblance with those of the double-perovskite-block compounds $BaLn_2Fe_2O_7$ and $SrLn_2Fe_2O_7$. However, the c/a ratio of the tetragonal cell is somewhat larger for the manganese compounds than for the iron compounds, due to a Jahn–Teller distortion of the $Mn^{3+}O_6$ octahedral sites.

The Crystal Structure of Barium Manganese(II) Iron(III) Fluoride $BaMnFeF_7$. H. HOLLER, D. BABEL*, M. SAMOUËL, AND A. DE KOZAK. Sonderforschungsbereich 127 and Fachbereich Chemie der Philipps-Universität, Hans-Meerwein-Strasse, D3550 Marburg, West Germany. The crystal structure of the monoclinic compound $BaMnFeF_7$ has been determined: $a = 553.2(1)$, $b = 1098.0(2)$, $c = 918.3(1)$ pm, $\beta = 94.67(1)°$, $V = 555.9(3) \times 10^{-24}$ cm^3, $Z = 4$. All atoms are in general positions of space group $P2_1/c$, weighted $R = 0.031$, using 1771 independent single-crystal reflections with $I > 2\sigma(I)$. The structure consists of edge-sharing dinuclear $Mn_2F_{10}^{6-}$ units (Mn–Mn = 322.2 pm), linked via corners by intermediate FeF_6 octahedra, at which two *cis* ligands remain unbridged. The average distances in the distorted octahedra are Mn–F = 211.6 pm and Fe–F = 192.7 pm. The barium atoms are irregularly 12-coordinated with a mean distance Ba–F = 290.5 pm. The structure is discussed in relation to the trigonal weberite Na_2MnFeF_7 and others.

Electrical Conductivity in Strontium Titanate. U. BALACHANDRAN AND N. G. EROR*, Oregon Graduate Center, Beaverton, Oregon 97006. The electrical conductivity of polycrystalline $SrTiO_3$ was determined for the oxygen partial pressure range of 10^0–10^{-22} atm and temperature range of 800 to 1050°C. The data were found to be proportional to the $-1/6$th power of the oxygen partial pressure for the oxygen pressure range 10^{-5}–10^{-22} atm, proportional to $P_{O_2}^{-1/4}$ for the oxygen pressure range 10^{-8}–10^{-15} atm, and proportional to $P_{O_2}^{+1/4}$ for the oxygen pressure range 10^0–10^{-3} atm. These data are consistent with the presence of very small amounts of acceptor impurities in $SrTiO_3$.

New Ternary Molybdenum Chalcogenides $M_{1+x}Mo_6Se_8$, with M = Np, Pu, Am. C. H. DE NOVION*, D. DAMIEN, AND H. HUBERT, SESI, Bâtiment 31, CERN B.P. n°6, 92260 Fontenay-aux-Roses, France. The ternary molybdenum selenides $An_{1.0}Mo_6Se_8$ and $An_{1.2}Mo_6Se_8$ (An = Np, Pu, Am) have been synthetized, and characterized by X-ray powder diffraction. They crystallize in the rhombohedral system and are isomorphous to the corresponding rare-earth compounds. The magnetic susceptibilities and electrical resistivities of the Pu- and Am-based compounds have been measured: the actinide ions are found to be trivalent in both compounds. No superconducting transition was found for $Pu_{1+x}Mo_6Se_8$ and $Am_{1+x}Mo_6Se_8$ down to 2.5 and 3.5 K respectively, contrary to the case of $Np_{1+x}Mo_6Se_8$ for which T_c = 5.6 K. The reasons of this different behavior are discussed.

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