

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, Faculté des Sciences Mirande, B.P. 138, 21004 Dijon Cedex, France. The effect of substitution extent on formation of superstructure-ordered vacancies in zinc-substituted lacunar spinels of type $Zn_{2-x}^{2+}Fe_{1-x}^{3+}(Fe_{(5+x)/3}^{3+} \square_{(1-x)/3})_B O_4^{2-}$ 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 $\alpha\text{Fe}_2\text{O}_3$ 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 $\alpha\text{Fe}_2\text{O}_3$.

Données cristallographiques sur une nouvelle série 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'Herès, 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, $\beta = 94.67(1)^\circ$, $V = 555.9(3) \times 10^{-24}$ cm³, $Z = 4$. 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 $Mn_2F_{10}^-$ 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 $10^0\text{-}10^{-22}$ 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 $10^{-5}\text{-}10^{-22}$ atm, proportional to $P_{O_2}^{-1/4}$ for the oxygen pressure range $10^{-8}\text{-}10^{-15}$ atm, and proportional to $P_{O_2}^{+1/4}$ for the oxygen pressure range $10^0\text{-}10^{-3}$ 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 synthesized, 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.

* Asterisks indicate author to be addressed.