

## Abstracts of Forthcoming Articles

*A Study of Infrared Absorption in the Oxidation of Zinc-Substituted Magnetites to Defect Phase  $\gamma$  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  $635\text{-cm}^{-1}$  absorption band, which is characteristic of these lacunar spinels, we show that the transformation temperature of the  $\gamma$  phases into  $\alpha\text{Fe}_2\text{O}_3$  increases with zinc substitution extent. For the  $\alpha$  phases obtained at  $700^\circ\text{C}$  we have found a linear variation between the intensity difference of the  $390\text{-}$  and  $450\text{-cm}^{-1}$  absorption bands and the percentage of  $\alpha\text{Fe}_2\text{O}_3$ .

*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'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,  $\beta = 94.67(1)^\circ$ ,  $V = 555.9(3) \times 10^{-24}$  cm<sup>3</sup>,  $Z = 4$ . 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  $1050^\circ\text{C}$ . 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 NOVIION\*, 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.

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