

Abstracts of Forthcoming Articles

Etude structurale du conducteur anionique $\text{Bi}_{0.765}\text{Sr}_{0.235}\text{O}_{1.383}$. PIERRE CONFLANT, JEAN-CLAUDE BOIVIN, AND DANIEL THOMAS, Laboratoire de Cristallographie, Université des Sciences et Techniques de Lille, 59655 Villeneuve D'Ascq Cedex, France. The structure of an O^{2-} conductor, the rhombohedral ($a = 9.75 \text{ \AA}$, $\alpha = 23.49^\circ$) low-temperature form of the solid solution $\text{Bi}_{1-x}\text{Sr}_x\text{O}_{1.5-x/2}$ ($x = 0.235$, $Z = 3$) has been solved in space group $R\bar{3}m$ by means of Fourier synthesis and least-squares refinements. Intensity data were corrected for absorption. The final R value is 0.030 for 302 independent planes. Most of the bismuth atoms are located on a first set with a distorted tetrahedral coordination while the remaining bismuth and the strontium atoms are distributed on a single position with an eightfold ($6+2$) oxygen coordination. Two types of anionic sites are detected within the tetrahedral voids of the cations sheets stacked along the $[111]$ axis. This results in a layered structure, with loosely bound oxide ions, providing a basis for the interpretation of the ionic conductivity of the phase.

Defect Structures in the Brannerite-Type Vanadates. II. Mechanism of the Solid-State Synthesis of $\text{Mn}_{1-x}\phi_x\text{V}_{2-2x}\text{Mo}_{2x}\text{O}_6$ ($0 \leq x \leq 0.33$). JACEK ZIÓLKOWSKI, ROMAN KOZŁOWSKI, DRZYSZTOF MOCAŁA, AND JERZY HABER, Institute of Catalysis and Surface Chemistry, Polish Academy of Sciences, ul. Niezapominajek, 30-239 Kraków, Poland. The mechanism of solid-solid reactions in three-component mixtures (Mn_2O_3 , V_2O_5 , MoO_3) has been studied by X-ray and thermogravimetric methods. The synthesis of $\text{Mn}_{1-x}\phi_x\text{V}_{2-2x}\text{Mo}_{2x}\text{O}_6$ solid solutions proceeds along three main reaction paths: (a) direct formation from oxides due to efficient surface diffusion of MoO_3 and V_2O_5 over Mn_2O_3 grains, (b) formation of MnMoO_4 followed by its reaction with V_2O_5 and dilution of the obtained phase with V_2O_5 and Mn_2O_3 , (c) reaction of preformed MnV_2O_6 and MnMoO_4 with V_2O_5 . The contribution of the above paths to the overall reaction depends on the composition of the initial mixture (x), temperature, and surface area of Mn_2O_3 . If the synthesis of a single-phase solid solution in an MoO_3 -poor region ($x < 0.20$) is aimed at, thermal treatment parameters should be selected in such a way as to exclude the preformation of MnV_2O_6 which, once formed, is not subsequently consumed to the equilibrium phase.

Layer structure: The oxides $\text{A}_3\text{Ti}_5\text{MO}_{14}$. M. HERVIEU, H. REBBAH, G. DESGARDIN, AND B. RAVEAU, Laboratoire de Cristallographie et Chimie du Solide, Université de Caen, 14032 Caen Cedex, France. Five new oxides— $\text{K}_3\text{Ti}_5\text{MO}_{14}$, $\text{Rb}_3\text{Ti}_5\text{MO}_{14}$ ($M = \text{Ta}, \text{Nb}$), and $\text{Ti}_3\text{Ti}_5\text{NbO}_{14}$ —have been synthesized. The structure of these oxides consists of octahedral layers which are similar to those observed for $\text{Na}_2\text{Ti}_3\text{O}_7$ and are held together by monovalent ions; the sheets consist of blocks of 2×3 edge-sharing octahedra, which are then joined to each other by the corners of the octahedra. The relative disposition of the layers is similar to that observed for $\text{Ti}_2\text{Ti}_4\text{O}_9$. These oxides can be considered as the member $n = 3$ of a series of closely related structures with formula $\text{A}_n\text{B}_{2n}\text{O}_{4n+2}$, where n indicates the number of octahedra which determines the width of the blocks of $2 \times n$ octahedra.

Effects of Additions of TiO_2 , SnO_2 , Ga_2O_3 , and MgO on the Phase Equilibria, Stoichiometry, and Lattice Parameter of $\text{Ni}_{0.89}\text{Fe}_{2.11}\text{O}_4$. P. K. GALLAGHER, D. W. JOHNSON, JR., H. SCHREIBER, JR., AND E. M. VOGEL, Bell Laboratories, Murray Hill, New Jersey 07974. Additions up to a mole fraction of 0.1 of TiO_2 , SnO_2 , Ga_2O_3 , and MgO were made to $\text{Ni}_{0.89}\text{Fe}_{2.11}\text{O}_4$. Pellets were equilibrated in O_2 , 0.1% O_2 in N_2 , and N_2 at 1150, 1250, and 1350°C. Chemical and microstructural analysis enabled the determination of phase boundaries and the mechanisms of charge compensation. Charge compensation for the solubility of the additives in the spinel was predominantly (70%) by Fe^{2+} formation, as opposed to cation vacancy formation, under the more oxidizing conditions and approached 100% under the reducing conditions. Variations in the lattice parameter of the spinel were noted as a function of additive, vacancy, and Fe^{2+} concentrations.

Phase Equilibria in the System between NbO_2 and Nb_2O_5 at High Temperatures. KEIJI NAITO, NAOKI KAMEGASHIRA, AND NORIO SASAKI, Department of Nuclear Engineering, Faculty of Engineering,