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# Abstracts of Forthcoming Articles

*Etude structurale du conducteur anionique* $Bi_{0.765}Sr_{0.235}O_{1.383}$. PIERRE CONFLANT, JEAN-CLAUDE BOIVIN, AND DANIEL THOMAS, Laboratoire de Cristallochimie, Université des Sciences et Techniques de Lille, 59655 Villeneuve D'Ascq Cedex, France. The structure of an $O^{2-}$ conductor, the rhombohedral ($a = 9.75$ Å, $\alpha = 23.49°$) low-temperature form of the solid solution $Bi_{1-x}Sr_xO_{1.5-x/2}$ ($x = 0.235$, $Z = 3$) 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* $Mn_{1-x}\phi_xV_{2-2x}Mo_{2x}O_6$ ($0 \leq x \leq 0.33$). JACEK ZIÒŁKOWSKI, 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 $Mn_{1-x}\phi_xV_{2-2x}Mo_{2x}O_6$ 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* $A_3Ti_5MO_{14}$. 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—$K_3Ti_5MO_{14}$, $Rb_3Ti_5MO_{14}$ ($M$ = Ta, Nb), and $Tl_3Ti_5NbO_{14}$—have been synthesized. The structure of these oxides consists of octahedral layers which are similar to those observed for $Na_2Ti_3O_7$ and are held together by monovalent ions; the sheets consist of blocks of $2 \times 3$ 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 $Tl_2Ti_4O_9$. These oxides can be considered as the member $n = 3$ of a series of closely related structures with formula $A_nB_{2n}O_{4n+2}$, 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* $Ni_{0.89}Fe_{2.11}O_4$. 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 $Ni_{0.89}Fe_{2.11}O_4$. 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,

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