JOURNAL OF SOLID STATE CHEMISTRY 32, 127–135 (1980)

Abstracts of Forthcoming Articles

New Pyrochlores of the Charge-Coupled Type. R. A. McCAULEY AND F. A. HUMMEL. Department of Ceramics, College of Engineering, Rutgers, The State University of New Jersey, Piscataway, New Jersey 08854.

For $A^{2+}A^{4+}Ti_2O_7$-type compositions, it was found that an upper limit of 0.23 Å for the size difference of the A cations existed for pyrochlore formation. Pyrochlores of the $A^{1+}A^{3+}Ta_2O_7$ type could not be formed. Although pyrochlores of the $A_2^{1+}B_2^{6+}O_7$ type could not be prepared, pyrochlores of the type $A^{1+}A^{3+}B^{4+}B^{6+}O_7$ could be prepared. Compositions of the type $Ca_xGd_{2-x}Sn_{2-x}Sb_xO_7$ ($x = 0$ to 1) showed that the pyrochlore structure could form partial crystalline solutions with compositions of the weberite structure.

Superconductivity of Some Transition Metal Compounds. A. NORLUND CHRISTENSEN, S. E. RASMUSSEN, AND G. THIRUP. Department of Inorganic Chemistry, Aarhus University, DK-8000 Aarhus C, Denmark.

Single crystals of niobium carbonitride were made by zone melting growth methods and single crystals of γ-NbN and δ-NbN by zone annealing crystal growth. The crystals are nonstoichiometric in contrast to the niobium carbonitride or niobium nitride prepared in reaction with nitrogen gas and niobium–niobium carbide mixtures and niobium metal, respectively. The transition temperature for superconductivity (T_c) decreases with increasing deviation from stoichiometry, and a determination of T_c is a nondestructive determination of this deviation. An instrument using the Wheatstone bridge principle is described and T_c values are listed for some nonstoichiometric single crystals of niobium carbonitride and niobium nitride.

Calorimetric Investigation of the Ferroelectric $\bar{4}3m$–$mm2$ Phase Transition in Boracite Crystals. M. DELFINO, G. M. LOIACONO, W. A. SMITH, AND P. S. GENTILE. Philips Laboratories, Briarcliff Manor, New York 10510.

The isobaric molar heat capacity of Cr–Cl, Fe–I, Cu–Cl, Ni–Br, and Zn–Br boracite at the ferroelectric $\bar{4}3m$–$mm2$ phase transition is reported. The magnitude of the rise in C_p at the transition, and the large upper bound values of ΔH and ΔS prove that the phase transition is first order. The values of ΔH follow the trend Zn–Br $\gg$ Ni–Br > Cr–Cl $\gg$ Cu–Cl > Fe–I, reflecting possible structural dissimilarities among the boracites. Thermal annealing of single-crystal boracite samples of Ni–Br and Cr–Cl is found to remove multiple peaking of the heat capacity at the transition resulting in single-peak heat capacity curves. The multiple peaking is thought to arise from internal stresses within the crystal.

Intergrowth in Complex Bismuth Oxides, $Bi_2CaNa_{n-2}Nb_nO_{3n+3}$ ($n = 5 \sim 8$), Revealed by 1-MV High-Resolution Electron Microscopy. SHIGEO HORIUCHI, KUNITAKA MURAMATSU, AND MASAJI SHIMAZU. National Institute for Research in Inorganic Materials, Sakura-mura, Niihari-gun, Ibaraki, 300-31 Japan.

A complex bismuth oxide crystal, prepared by heating powders with a nominal composition $Bi_2CaNb_2O_9 \cdot 4NaNbO_3$, is composed of several phases, $Bi_2CaNa_{n-2}Nb_nO_{3n+3}$, mainly with $n = 5$ to 8. One-megavolt high-resolution electron microscopy reveals that the structure of each phase is constructed by perovskite-like layers interleaved with Bi_2O_2 sheets. One of these phases grows only in limited regions, in which other phases with different values of n intergrow very finely. This causes a characteristic intensity profile on the diffraction pattern. Experimental evidence on the reaction of the crystal with water is presented.

The structure of the 27-Layer Polytype of $BaCrO_3$. PAUL S. HARADEM, BERTRAND L. CHAMBERLAND, AND LEWIS KATZ. Department of Chemistry and Institute of Materials Science, University of Connecticut, Storrs, Connecticut 06268.

0022-4596/80/040127-09$02.00/0