JOURNAL OF SOLID STATE CHEMISTRY 39, 401–404 (1981)

Abstracts of Forthcoming Articles

Ionic Conductivity of Pure, Ca^{2+}-, and Sr^{2+}-Doped Single Crystals of LiCl. M. SHARON* AND R. R. PRADHANANGA, Department of Chemistry, Indian Institute of Technology, Bombay-400076, India. Single crystals of pure and doped LiCl were grown by the Bridgeman technique. The ionic conductivities of pure, Ca^{2+}- and Sr^{2+}-doped crystals of LiCl in the temperature range 250–580°C are reported. The enthalpy of formation of Schottky defects, enthalpy of migration of the Li^+ vacancy, and enthalpy of association of (Sr^{2+} ion–Li^+ vacancy) have been calculated by detailed isotherm calculation. The various conductivity parameters are: Enthalpy of formation of Schottky defects: 1.66 ± 0.03 eV; Enthalpy of migration of the Li vacancy: 0.59 ± 0.03 eV; Enthalpy of association between Sr^{2+}–Li^+ vacancy: 0.61 ± 0.02 eV.

Self-Compensation in Lanthanum-Doped Strontium Titanate. N. G. EROR* AND U. BALACHANDRAN. Oregon Graduate Center, Beaverton, Oregon 97006. Gravimetric measurements on pure and lanthanum-doped $SrTiO_3$ have shown that the reversible change of oxygen content between specified states of oxidation and reduction is proportional to the dopant concentration. These measurements indicate that the donor-dopants are electronically compensated by additional oxygen uptake in the oxidized state. The range of this reversible change in oxygen stoichiometry is up to more than an order of magnitude larger than the oxygen nonstoichiometry of the undoped $SrTiO_3$. A single phase region from $La_{0.2}Sr_{0.8}Ti^{4+}_{0.8}Ti^{3+}_{0.2}O_3$ to $La_{0.2}Sr_{0.8}Ti^{4+}O_{3.10}$ has been confirmed for lanthanum-doped $SrTiO_3$. The gravimetric measurements can be explained by a model involving a shear structure.

Preparation of TaS_3 under High Pressure. S. KIKKAWA,* M. KOIZUMI, S. YAMANAKA, Y. ONUKI, R. INADA, AND S. TANUMA, The Institute of Scientific and Industrial Research, Osaka University, Osaka, 565, Japan. Monoclinic TaS_3 is prepared without the coexistence of the orthorhombic TaS_3 and TaS_2 under high pressure in a cubic anvil device. Lattice parameters are $a = 9.552$ Å, $b = 3.345$ Å, $c = 14.925$ Å, and $\beta = 109.98°$. The compound is a semiconductor with transitions at 200 and 250 K.

Etude des phases β et haute pression du phosphate tricalcique par la RPE de l'ion Cu^{2+}. S. S. ROMDHANE, G. BACQUET,* ET G. BONEL, Laboratoire de Physique des Solides, Université Paul Sabatier, 118, route de Narbonne, 31062 Toulouse Cedex, France. Copper (II)-doped powdered samples of β-$Ca_3(PO_4)_2$ and of its high-pressure phase, which is an isotype of $Ba_3(VO_4)_2$, were studied by ESR. In each case the RT spectrum is due to a unique type of defect exhibiting orthorhombic and respectively axial symmetry. The spin-Hamiltonian parameters were determined using the method proposed by Rollmann and Chan for polycrystalline specimens. With stressed samples the contribution of each of both copper isotopes was resolved. Our results show that isolated copper ions substitute preferentially for calcium in Ca(III) sites of β-calcium orthophosphate, these sites corresponding to the Ca(I′) ones in the high-pressure phase.

Phase Relations of Ternary Compounds in the Ba–Fe–S System. T. P. PERNG, N. KIMIZUKA, AND H. STEINFINK,* Materials Science Laboratories, Department of Chemical Engineering, The University of Texas, Austin, Texas 78712. The phase relations of the ternary phases at 900 and 700°C were determined by heating mixtures in the regions BaS–FeS–FeS_2 and Fe–FeS–BaS and identifying the products by powder X-ray diffraction. The stable ternary phases at 900°C are $BaFe_2S_3$, Ba_2FeS_3, $Ba_6Fe_8S_{15}$, a solid solution $BaFeS_2$–$Ba_7Fe_6S_{14}$, Ba_2FeS_4, the infinitely adaptive series $Ba_3Fe_{1+x}S_5$, $\frac{1}{3} \leq x \leq \frac{2}{3}$, and $Ba_9Fe_{16}S_{32}$, which belongs to the infinitely adaptive series $Ba_{1+x}Fe_2S_4$. At 700°C the stable ternary phases are: $BaFe_2S_3$, Ba_2FeS_3, $BaFeS_2$–$Ba_7Fe_6S_{14}$ solid solution, $Ba_6Fe_8S_{15}$, Ba_2FeS_4, $Ba_5Fe_4S_{11}$, and two infinitely adaptive series $Ba_3Fe_{1+x}S_5$ and $Ba_{1+x}Fe_2S_4$. A stable ternary phase at 700 and 900°C with probable composition $Ba_2Fe_4S_5$ was found in the Fe–FeS–BaS section.

Magnetic Interactions in Ternary Cobalt Oxide with Cubic Perovskite Structure. H. TAGUCHI, M. SHIMADA,* AND M. KOIZUMI, The Institute of Scientific and Industrial Research, Osaka University, Suita, Osaka, 565, Japan. Magnetic properties were measured on the cubic perovskite systems

* Asterisks indicate author to be addressed.

0022-4596/81/120401-04$02.00/0