

Abstracts of Forthcoming Articles

Electrical Transport Properties of Zn Doped ZnO. K. I. HAGEMARK, L. C. CHACKA. 3M Central Research Laboratories, P.O. Box 33221, St. Paul, Minnesota 55133. Electrical resistivity and Hall effect measurements at 77–373 K are presented for Zn doped ZnO crystals. The crystals have been doped systematically at 600–1100°C in controlled pressures of Zn. The concentration of electrons at room temperature is in the range $n_{RT} = 2.5 \times 10^{16}$ to $3.6 \times 10^{18} \text{ cm}^{-3}$. The donor level E_D and the concentrations of donors N_D and acceptors N_A have been calculated from a best fit to the experimental relationships $\log n$ versus $1/T$ and $\log \mu_H$ versus $\log T$. At dilute concentrations of donor two donor levels have been observed, $E_D^1 = 0.043\text{--}0.045 \text{ eV}$ and a deeper level E_D^2 greater than 0.165 eV . The ZnO was found to behave as a metal at $N_D \sim 6 \times 10^{18} \text{ cm}^{-3}$. At least two different donors have to be assumed in order to explain the experimental results. It is suggested that interstitial Zn is the electrical active donor at higher doping levels. The nature of the other donor is not clear. Neither “1s¹” H-type nor “1s²” He-type donors seem to consistently explain all the observations.

Study of the Ternary System Fe–Cr–Te Around the Composition FeCr₂Te₄. A. BEGOUEN-DEMEAUX, G. VILLERS, P. GIBART. Laboratoire de Magnétisme, C.N.R.S., 1, Place Aristide Briand, 92190 Meudon-Bellevue, France. The system Fe–Cr–Te was investigated around the composition FeCr₂Te₄. FeCr₂Te₄ is a metastable compound. Single crystals with Fe_{0.93}Cr_{1.76}Te₄ composition were grown by vapor transport or Bridgman method. These crystals are metallic and anisotropic ferromagnets.

Perovskite-like La_{1-x}K_xMnO₃ and Related Compounds: Solid State Chemistry and the Catalysis of the Reduction of NO by CO and H₂. R. J. H. VOORHOEVE, J. P. REMEIK, L. E. TRIMBLE, A. S. COOPER, F. J. DISALVO, AND P. K. GALLAGHER. Bell Laboratories, Murray Hill, New Jersey 07974. The new compounds La_{1-x}M_xMnO₃ ($0.05 \leq x \leq 0.4$ for $M = \text{K}$; $x = 0.2$ for $M = \text{Na, Rb}$) have been prepared. La_{1-x}K_xMnO₃ ($0.05 \leq x \leq 0.4$), LaMnO_{3.01}, LaMnO_{3.15}, La_{0.8}Na_{0.2}MnO₃ and La_{0.8}Rb_{0.2}MnO₃ have been used as catalysts in the reduction of NO. La_{0.8}K_{0.2}MnO₃ has also been used in the catalytic decomposition of NO. The activity of these catalysts is related to the presence of a Mn³⁺/Mn⁴⁺ mixed valence and to the relative ease of forming oxygen vacancies in the solid. The presence of cation vacancies in LaMnO_{3.15} and the substitution of La³⁺ by alkali ions in LaMnO₃ increases the catalytic activity. The reduction of NO involves both molecular and dissociative adsorption of NO.

Evidence for the Initiation of Copper Azide [Cu(N₃)₂] and Thallium Azide [TlN₃] by Carrier Emission from Schottky Barrier Contacts. PETER MARK AND THADDEUS GORA. Department of Electrical Engineering, Princeton University, Princeton, New Jersey 08540. It has been reported that the initiation field e_i for Cu(N₃)₂ (*p*-type material) increases with anode metal work function while e_i for TlN₃ (*n*-type material) decreases with cathode metal work function. It is shown that this behavior is consistent with carrier emission from a Schottky barrier contact.

Electronic and Magnetic Properties of LaNi_{1-x}Co_xO₃, LaCo_{1-x}Fe_xO₃ and LaNi_{1-x}Fe_xO₃. C. N. R. RAO, O. PRAKASH, AND P. GANGULY. Department of Chemistry, Indian Institute of Technology, Kanpur 208016, India. LaNi_{1-x}Co_xO₃ shows itinerant *d*-electron behavior similar to LaNiO₃ up to $x = 0.5$. In the range $0.5 < x < 1.0$ the cobalt spin state equilibrium is markedly affected; the localized-itinerant electron transition of LaCoO₃ is not seen when $x < 0.95$. In LaCo_{1-x}Fe_xO₃, itinerancy of *d*-electrons decreases with increase in x and the compositions with $x > 0.5$ are similar to LaFeO₃. If $x > 0.1$ the localized-itinerant electron transition is not seen and the cobalt spin state equilibrium is considerably altered. In LaNi_{1-x}Fe_xO₃, itinerancy decreases with increase in x . These observations can be satisfactorily explained in terms of Goodenough's energy band schemes.

Statistical Approach to Anderson–Grüneisen Parameters δ . S. GUPTA, M. N. SHARMA, AND S. R. TRIPATHI. Department of Physics, Lucknow University, Lucknow-226007, India. A simple and general relation has been developed for the Anderson–Grüneisen parameter δ in terms of the Grüneisen parameter γ , employing a statistical approach for ionic crystals. The relation can be expressed as:

$$\delta = a\gamma^b$$

where a and b are some arbitrary constants. It has been concluded that the developed relation is a general form of Chang's relation ($\delta = 2\gamma$).