The Defect Structure of CdTe; Self-Diffusion Data. S. S. CHERN AND F. A. KROGER. Department of Materials Science, University of Southern California, University Park, Los Angeles, California 90007. Cadmium and Te tracer self-diffusion was studied for pure and indium-doped CdTe. Analysis of the results leads to a point defect model in which imperfections with various charges play a role. Expressions for the tracer diffusion coefficients by various mechanisms and for the diffusion coefficients of individual point defects are arrived at.

Magnetic Susceptibility and Torque Measurements of FeV_2S_4, FeV_2Se_4, and $FeTi_2Se_4$. S. MURANAKA AND T. TAKADA. Institute for Chemical Research, Kyoto University, Uji, Kyoto-fu, Japan. Magnetic susceptibility and torque measurements of FeV_2S_4, FeV_2Se_4, and $FeTi_2Se_4$ were made using the powder and the single-crystal samples. The inverse susceptibility of FeV_2S_4, FeV_2Se_4, and $FeTi_2Se_4$ changed its slope at 850, 820, and 700 K, respectively, at which temperature the order–disorder transition of cation vacancies should seem to take place. Above these temperatures the paramagnetic moment obtained for these compounds was in the range of 5.26–5.37 μ_B, close to that of the high spin state Fe^{2+}. Below these temperatures the paramagnetic moment was reduced to 4.23–4.35 μ_B. The antiferromagnetic spin axis of FeV_2S_4 was in the neighborhood of the [101] direction and that of FeV_2Se_4 and $FeTi_2Se_4$ in the direction of the *c*- axis. The large magnetic anisotropy observed of the *c* axis were attributed to the spin-orbit interaction of Fe^{2+} electrons in the trigonal crystal field.

An ^{57}Fe Mössbauer Effect of Magnetic Ordering in the Fe_2O_3–Cr_2O_3 System. T. BIRCHALL AND A. F. REID. Division of Mineral Chemistry, CSIRO, Box 124, Port Melbourne, Australia. ^{57}Fe Mössbauer effect spectra have been obtained as a function of temperature for a series of Fe_2O_3–Cr_2O_3 compositions in the range 0.2–75 % Fe_2O_3. From 30 % of Fe_2O_3 upwards, the dependence of the reduced internal magnetic field $H_{eff}(T)/H_{eff}(T=0)$ on reduced temperature, T/T_N, was found to be identical with that for α-Fe_2O_3, indicating the persistence of Fe_2O_3-type ordering over this composition range. For 0.2 % of $^{57}Fe_2O_3$ in Cr_2O_3, the reduced field values fall far below those for α-Fe_2O_3 or Cr_2O_3, and weak coupling of Fe^{3+} with Cr^{3+} has been inferred. A Morin transition similar to that for α-Fe_2O_3 was not present for samples containing 75 % of Fe_2O_3. Quadrupole shifts ε were found to be negative and diminishing between 75 and 30 % Fe_2O_3, and positive between 20 and 0.2 %. The limiting value at lowest dilution of 0.113 ± .010 mm/sec corresponds to a nuclear quadrupole coupling constant e^2qQ of 0.45 ± .04, approximately half that for α-Fe_2O_3. Cone angles for Fe^{3+} spin vectors in the spin–spiral arrangements for intermediate compositions have been derived, and are similar to, but less extreme than those deduced from neutron diffraction data.

Sur les Propriétes Electriques et Magnétiques des Phases M_xZrS_2 ($M = Fe, Co, Ni$). L. TRICHET, J. ROUXEL, AND M. POUCHARD. Laboratoire de Chimie Minerale A, E.R.A. No. 472, 38 Boulevard Michelet, 44037 Nantes Cedex, France. The M_xZrS_2 systems with $M = Fe$, Co, Ni have been investigated. Nonstoichiometric phases are observed with M in the tetrahedral sites between ZrS_2 layers. Electric measurements characterize a semiconducting behavior and suggest the occurrence of trigonal zirconium + III clusters. Magnetic measurements seem to confirm also M–M bond formation.

The Synthesis and Crystal Structure of $CaCu_3Mn_4O_{12}$: A New Ferromagnetic Perovskite-like Compound. J. CHENAVAS, J. C. JOUBERT, M. MAREZIO, AND B. BOCHU. Laboratoire des Rayons X, C.N.R.S., Rue des Martyrs, B.P. 166, 38042 Grenoble Cedex, France. Single crystals of $CaCu_3Mn_4O_{12}$, a new ferromagnetic perovskite-like compound ($T_c \simeq 160°C$), have been synthesized at 50 kbar and 1000°C. By X-ray analysis it was found to be cubic ($a = 7.241$ Å), space group $Im3$ with two molecules per unit cell. The $2Ca^{2+}$ and $6Cu^{2+}$ cations occupy the *A*-sites of the ideal perovskite structure while the $8Mn^{4+}$ cations occupy the *B*-sites. In the $Im3$ space group the sites occupied by the calcium and copper cations have different point symmetry and therefore the 12-oxygen polyhedra have different distortions. The Ca cations are surrounded by slightly distorted isosahedra, the Ca–O distance being 2.562 Å. The 12 oxygens around the copper cations are arranged as three mutually perpendicular rectangles of different size, the smallest and the largest being almost squares. The three sets of Cu–O distances are 1.942, 2.707, and 3.181 Å, respectively. The octahedral Mn–O distance is 1.915 Å. This arrangement is similar to that one found in $NaMn_3O_{13}$. A comparison between the two structures and a discussion of their thermal data are given.