of the rutile phase TiO_{2-x}, respectively, using the method of equilibrium between oxides and buffer gaseous mixtures and by means of a high temperature microcalorimeter. These results are discussed in terms of point defects.

The Iodates of Scandium. K. Nassau and J. W. Shiever. Bell Laboratories, Murray Hill, New Jersey 07974. A dihydrate, a monohydrate, and three polymorphs of the anhydride $Sc(IO_3)_3$ have been prepared and studied, $Sc(IO_3)_3 \cdot 2H_2O$ was prepared by gel growth and by precipitation and evaporation at room temperature. The γ-anhydride can be crystallized from boiling water or nitric acid solution. The other compounds are formed on heating the dihydrate, which also dehydrates very slowly at room temperature. The α-anhydride is amorphous. The β-anhydride generates second harmonics, with about twice the efficiency of quartz. In addition, DTA, TGA, infrared absorption, and powder X-ray diffraction results are presented.

High Resolution Electron Microscopy of Crystallographic Shear Structures in Tungsten Oxides. S. Iijima. Department of Physics, Arizona State University, Tempe, Arizona 85281. A crystallographic shear (CS) structure in reduced crystals of WO_3 has been imaged at a resolution of 3–4 Å by a high resolution electron microscope. A large distortion of the WO_6 octahedra sharing their edges at the CS planes has been directly recognized in the electronmicrographs. The CS occurs preferentially in a particular crystallographic orientation. The preference may be explained by a different degree of distortion along the principal axes in the WO_6 octahedra of the pseudocubic structure of WO_3 crystal. A model for growth and ordering of the CS planes is discussed.

Etude Structurale de $Na_4Sn_3S_8$ Evolution de la Coordination de l'Etain dans le Systeme Na_2S–SnS_2. J. C. Jumas, E. Philipott, and M. Maurin. Laboratorire de Chimie Minerale C, ERA 314, Université des Sciences et Techniques du Languedoc, Place Eugene Bataillon, 34060 Montpellier Cedex, France. The crystal structure of $Na_4Sn_3S_8$ has been determined. This compound crystallizes in the monoclinic system space group $C2/c$ with the following parameters: $a = 11.427$, $b = 7.337$, $c = 17.621$ Å, $\beta = 95.27°$, and $z = 4$. The structure has been solved with the help of a tridimensional Patterson synthesis. The reliability factor after refinement converges to 0.043 for 1620 independent reflexions. The structure contains SnS_4 tetrahedra and SnS_5 trigonal bipyramids linked together to form a tridimensional lattice of general formula $(Sn_3S_8)_n$.

Energy Transfer in Mercury-Doped Calcium Tungstate and Molybdate. G. Blasse. Solid State Department, Physical Laboratory, University of Utrecht, Sorbonnelaan 4, Utrecht, The Netherlands, The luminescence of $CaWO_4$–Hg and $CaMoO_4$–Hg is reported. The presence of Hg^{2+} ions in the $CaWO_4$ lattice influences the luminescence of pure $CaWO_4$ drastically due to efficient energy transfer from host lattice groups to the emitting center consisting of a tungstate group with a neighboring mercuric ion. The luminescence characteristics of $CaMoO_4$–Hg do not differ strongly from those of pure $CaMoO_4$ due to the absence of efficient energy transfer.

Electronic Conductivity in Nonstoichiometric Cerium Dioxide. R. N. Blumenthal and R. K. Sharma. Metallurgy and Materials Science, College of Engineering, Marquette University, Milwaukee, Wisconsin 53233. The electrical conductivity of sintered specimens of nonstoichiometric CeO_{2-x} was measured as a function of temperature (750–1500°C) and oxygen pressure (1–10^{-22} atm). The isothermal compositional dependence of the electrical conductivity of CeO_{2-x} was determined by combining recently obtained thermodynamic data, $x = x(P_{O_2}, T)$, with the conductivity data. The compositional and temperature dependence of the electrical conductivity may be represented by the expression

$$\sigma = 410[x]\, e^{-(0.158+x)/kT} (\text{ohm-cm})^{-1}$$

over the temperature range 750–1500°C and from $x = 0.001$ to $x = 0.1$. This expression was rationalized in terms of the following simple relations for (*a*) the electron carrier concentration $n_{\mathrm{Ce}'_{\mathrm{Ce}}} = (8x)/a_0^3$ where $n_{\mathrm{Ce}'_{\mathrm{Ce}}}$ is the number of $\mathrm{Ce}'_{\mathrm{Ce}}$ per cm^3 and a_0 is the lattice parameter and (*b*) the electron mobility

$$\mu = 5.2(10^{-2})\, e^{-(0.158+x)/kT} (\text{cm}^2/\text{V sec}).$$