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Abstracts of Forthcoming Articles

The System GeO_2–FeO–Fe_2O_3 at 1000°C. E. TAKAYAMA,* N. KIMIZUKA, K. KATO, H. YAMAMURA, AND H. HANEDA, National Institute for Research in Inorganic Materials, Sakuramura, Niiharigun, Ibaraki, Japan-305. The phase diagram of the GeO_2–FeO–Fe_2O_3 system was established. Four new compounds, $Fe_{3.2}Ge_{1.8}O_8$, $Fe_9Ge_5O_{22}$, $Fe_4Ge_2O_9$, and $Fe_{10}Ge_9O_{29}$, were found in the system. The diagram is much more complex than the corresponding one of SiO_2–FeO–Fe_2O_3. The difference between the two systems may be related to the ionic radii of the cations, Ge^{4+} and Si^{4+}.

The Crystal Structure of Hydrogen Cerium(III) Sulfate Hydrate, $[H_3O]\,[Ce(SO_4)_2]\cdot H_2O$. B. M. GATEHOUSE,* AND A. PRING, Department of Chemistry, Monash University, Clayton, Victoria, Australia, 3168. $[H_3O]\,[Ce(SO_4)_2]\cdot H_2O$ crystallizes in the monoclinic system with unit-cell dimensions (from single-crystal data) $a = 9.359(4)$, $b = 9.926(4)$, $c = 8.444(3)$ Å, $\beta = 96.53(9)°$, and space group P^2_1/n, $z = 4$. The structure was solved by conventional heavy atom methods using 1787 counter-measured reflections (Mo$K\alpha$ radiation), and refined using full-matrix least-squares techniques to an R of 0.0465 ($wR = 0.0413$). The structure consists of cerium(III) ions in irregular 9-coordination to oxygen atoms from two bidentate sulfate ions, four monodentate sulfate oxygen atoms, and one water molecule. The oxonium ions are present as isolated ions in the structure and take part in the hydrogen bonding network. The Ce–O bond lengths range from 2.454(7) to 2.626(6) Å.

Structure Relationships Affecting the Stability of A15 and Ti_3P-type Compounds. R. M. WATERSTRAT, American Dental Association Health Foundation Research Unit, National Bureau of Standards, Washington, D.C. 20234. Observed interatomic distances in A15 and Ti_3P-type compounds are analyzed as deformations of ideal atomic rigid spheres. The analysis suggests that structural instabilities may develop in A15 compounds when the atomic size of the B-element becomes approximately 10% smaller than that of the A-element. These instabilities apparently originate from strong repulsive interactions along the atom chains. The internal strains associated with these interactions may be relieved by martensitic transformations, deviations from the ideal A_3B stoichiometry, addition of ternary elements, and transformation to a Ti_3P-type structure. Instability apparently develops in the Ti_3P-type compounds when the A and B element atoms are nearly equal in size. The instability in this case would result primarily from repulsive forces associated with a strong compression of the B-element atoms.

Heat Capacity and Thermodynamic Functions of the RFe_2 Compounds (R = Gd, Tb, Dy, Ho, Er, Tm, Lu) Over the Temperature Region 8 to 300 K. D. J. GERMANO, R. A. BUTERA,* AND K. A. GSCHNEIDNER, JR., Department of Chemistry, University of Pittsburgh, Pittsburgh, Pennsylvania 15260. Experimental heat capacity data for the Laves phase RFe_2 intermetallic compounds (R = Gd, Tb, Dy, Ho, Er, Tm, and Lu) have been determined over the temperature range 8 to 300 K. The error in these data is thought to be less than 1%. Smoothed heat capacity values and the thermodynamic functions. ($H^\circ_T - H^\circ_0$) and S°_T, are reported throughout the temperature range for the RFe_2 series. In addition, ($G^\circ_{298} - H^\circ_0$) at 298 K is reported for all the RFe_2 compounds. These data were analyzed and it was shown that the maxima in the thermodynamic functions near $HoFe_2$ are due to the magnetic contribution of the lanthanide element. The lattice contribution to the entropy at 300 K was estimated, and from this quantity the Debye temperature was calculated to be about 300 K which is in good agreement with the low-temperature heat capacity. Furthermore, this analysis indicates that the apparent electronic specific heat constants, γ, for $TbFe_2$, $DyFe_2$, and $HoFe_2$ reported earlier are in error.

Preparation and Structure Refinement of KTi_3TaO_9 and $K_3TiTa_7O_{21}$. B. M. GATEHOUSE* AND M. C. NESBIT, Department of Chemistry, Monash University, Clayton, Victoria, 3168 Australia. KTi_3TaO_9 crystallizes in the orthorhombic system with unit-cell dimensions $a = 6.392(2)$, $b = 3.793(1)$, $c =$

Note. Asterisks indicate author to be addressed.

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