Saitama, 351 Japan. The crystal structure of $Mg_{51}Zn_{20}$, a phase designated conventionally as "$Mg_7Zn_3$," has been determined by the single-crystal X-ray diffraction method. It was solved by the examination of a Patterson synthesis, and refined by the ordinary Fourier and least-squares method; the $R$ value obtained was 4.8% for 1167 observed reflections. The crystal is orthorhombic, space group $Immm$, with $a = 14.083(3)$, $b = 14.486(3)$, $c = 14.025(3)$ Å, and $Z = 2$. There are 18 independent atomic sites, Zn1–Zn6, Mg1–Mg10, $A$, and $B$, and the last two sites are statistically occupied by Zn and Mg atoms with the occupancies 0.46(2)Zn7 + 0.52(2)Mg11 and 0.24(2)Zn8 + 0.74(2)Mg12 for $A$ and $B$, respectively. The structure of the crystal is described as an arrangement of icosahedral coordination polyhedra, to which all but the Zn3 site belong. In this arrangement the Zn atoms other than the Zn3 and Zn8($B$) center the icosahedral coordination polyhedra with coordination number 12. The Zn3, Zn8 atoms and all the Mg atoms except Mg11($A$) are located at the centers of various coordination polyhedra with the coordination numbers from 11 to 15. The distances between neighboring atoms are 2.71–3.07, 2.82–3.65, and 2.60–3.20 Å for Zn–Zn, Mg–Mg, and Zn–Mg, respectively.

*Studies of Layered Uranium (VI) Compounds. VI. Ionic Conductivities and Thermal Stabilities of* $MUO_2PO_4 \cdot nH_2O$, *where* $M = H, Li, Na, K, NH_4$ *or* $\frac{1}{2}Ca$, *and where n is between 0 and 4.* Christopher M. Johnson, Mark G. Shilton, and Arthur T. Howe, Department of Inorganic and Structural Chemistry, University of Leeds, Leeds LS2 9JT, England. We have measured the ionic conductivities of pressed pellets of the layer compounds $MUO_2PO_4 \cdot nH_2O$, and correlated the results with TGA data. The conductivities (in $ohm^{-1}$ $m^{-1}$), at temperatures increasing with decreasing water content over the range 20 to 200°C, were approximately as follows: $Li^+$-$4H_2O$, $10^{-4}$; $Li^+$-, $Na^+$-, $K^+$-, and $NH_4^+$-$3H_2O$, $10^{-4}$, $10^{-2}$, $10^{-4}$, and $10^{-4}$; $H^+$-, $Li^+$-, and $Na^+$-$1.5H_2O$, $10^{-2}$, $10^{-4}$, and $10^{-4}$; $Na^+$-$1H_2O$, $10^{-5}$; $H^+$-, $K^+$-, and $NH_4^+$-$0.5H_2O$, all $10^{-5}$; and $H^+$-, $Li^+$-, $Na^+$-, $K^+$-, $NH_4^+$-, and $\frac{1}{2}Ca^{2+}$-$0H_2O$, $10^{-5}$, $10^{-5}$, $10^{-4}$, $10^{-5}$, $10^{-6}$, and $10^{-6}$. A ring mechanism is proposed to account for the high conductivity found in $NaUO_2PO_4 \cdot 3.1H_2O$. The accurate TGA data showed that most of the hydrates had water vacancies of the Schottky type, and should be represented as $MUO_2PO_4(A - x)H_2O$, where $x$ can be between 0 and 0.3.

*Le systeme* $Ba_2Fe_2O_5$–$BaZnO_2$. *Mise en évidence de 3 nouvelles phases.* Patrick Neu, Michel Zanne, and Charles Gleitzer, Laboratoire de Chimie de Solide Minérale, Service de Chimie Minérale, Université de Nancy I, C.O. 140, 54037 Nancy Cedex, France. In order to obtain phases with a high deficiency of oxygen, iron is progressively substituted by zinc in $Ba_2Fe_2O_5$ at 900–1000°C. For $0.05 < x < 0.40$ ($x$ = Zn/Fe + Zn), the long-range order between tetrahedra and octahedra of the brownmillerite is destroyed and the cell is perovskite type with up to 23% oxygen vacancies. For $x = 0.5$ there is a new superlattice and an orthorhombic compound $Ba_4Fe_2Zn_2O_9$. For $0.7 < x < 0.9$ a new cubic phase is formed which is related to $BaZnO_2$.