been proposed which are consistent with the observed twinning behavior and cell symmetry. The same ordered structures are suggested for HUP from our observations of the twinning behavior.

Studies of Layered Uranium (VI) Compounds. IV. Proton Conductivity in Single-Crystal Hydrogen Uranyl Phosphate Tetrahydrate (HUP) and in Polycrystalline Hydrogen Uranyl Arsenate Tetrahydrate (HUAs). ARTHUR T. HOWE AND MARK G. SHILTON. Department of Inorganic and Structural Chemistry, University of Leeds, Leeds LS2 9JT, England.

Single-crystal measurements on hydrogen uranyl phosphate tetrahydrate, $HUO_2PO_4 \cdot 4H_2O$ (HUP), have confirmed that the high proton conductivity is a bulk characteristic. The conductivity values were in substantial agreement with those previously reported for polycrystalline disks. A conductivity of $0.6\ ohm^{-1}\ m^{-1}$ at 290°K and an activation energy of 30 ± 1 kJ $mole^{-1}$ were measured parallel to the structural layers of the crystal. The conductivity was at least 100 times lower when measured in the perpendicular direction. A reasonable attempt frequency ω_0 of approximately 10^{15} Hz could be derived from the parallel conductivity on the assumption that the charge carrier concentration was equal to that of the H_3O^+ ions. This implies a low proton mobility, of the order of $10^{-9}\ m^2\ V^{-1}\ sec^{-1}$ at 290°K, in support of previous estimates. We have also shown that polycrystalline hydrogen uranyl tetrahydrate, $HUO_2AsO_4 \cdot 4H_2O$ (HUAs), has a high conductivity of $0.6\ ohm^{-1}\ m^{-1}$ at 310°K, with an activation energy of 31 ± 2 kJ $mole^{-1}$. Below the respective dielectric ordering transition temperatures of HUP and HUAs of 274 and 301°K, the lower conductivity values show a marked frequency dependence, which may be due to dispersion effects caused by water reorientations.

Topotaxial Decomposition of Calcite-Type KNO_3 Crystals. S. W. KENNEDY AND W. M. KRIVEN. Department of Physical and Inorganic Chemistry, University of Adelaide, Adelaide, S.A. 5001, Australia.

The calcite-like form of potassium nitrate, KNO_3, decomposed under the transmission electron microscope to form KNO_2 which subsequently decomposed giving the high-temperature β form of K_2O. Two closely related orientation relations were observed for KNO_2. Referred to the four molecule cell of KNO_3, they were $[111]_{KNO_3} \| [111]_{KNO_2}$, $(0\bar{1}1)_{KNO_3} \| (0\bar{1}1)_{KNO_2}$; and $[100]_{KNO_3} \| [100]_{KNO_2}$, $(001)_{KNO_3} \| (001)_{KNO_2}$. These and a different published orientation relation for the decomposition of cadmium carbonate conform, respectively, to orientations resulting from a corresponding structural phase transformation in rubidium nitrate. β-K_2O formed with its cube axes parallel to those of KNO_2. Both nitrate and carbonate reactions can be regarded as topotaxial. Application of the crystallographic approach to orientations and accomodation of misregistry is discussed.

Structure Cristalline de la Phase β-KEr_2F_7 Composés Isotypes. S. ALEONARD, Y. LE FUR, M. F. GORIUS ET M. TH. ROUX. Laboratoire de Cristallographie, CNRS 166X-38042 Grenoble Cedex, France.

Potassium erbium fluoride β-KEr_2F_7 crystallizes in the orthorhombic system, space group $Pna2_1$, with the unit-cell dimensions $a = 11.820$ Å, $b = 13.333$ Å, $c = 7.816$ Å ($Z = 8$). The crystal structure has been solved from single-crystal diffractometer measurements ($AgK\alpha$) by Patterson and Fourier synthesis and refined by a least-squares method. The final R value is 0.042 for 2374 independent observed reflections ($R_W = 0.051$). The four species of erbium atoms are surrounded by eight fluorine atoms. These fluorine atoms form, respectively, three quadratic antiprisms and one dodecahedron, derived from a distorted cube. Two antiprisms and the dodecahedron share two of their faces to form $(Er_3F_{17})^{8-}$ groups. These groups are bidimensionally linked and the planes they form are joined together by the third antiprism. A three-dimensional network is then produced, in the tunnels of which potassium atoms are located. Lattice parameters of compounds which are isotypes to the new structure type of β-KEr_2F_7 are given.

Thermodynamische Untersuchungen am System CoO/MgO. K. TORKER UND W. INSELSBACHER. Institut für Physikalische und Theoretische Chemie, Technische Universität Graz, A-8010, Austria.

A series of solid solutions, $Co_xMg_{1-x}O$, was studied thermodynamically in the range 1100–1300 K by means of solid state galvanic cells using oxygen-ion conductors. The activities of CoO in the solid solutions show positive deviations from Raoult's law. The solid solutions are interpreted to be regular within the