tration of interstitial H_2O molecules that act as proton donor and acceptor sites. In the high temperature region, conduction is due to migration of NH_4^+ through cation vacancies. Detailed mechanisms are postulated both for electrical conduction and for electrode reactions.

Oxydes de Plomb: III. Étude par Diffraction des Rayons X sur Poudre Des Transitions Ferroelectrique et Ferroelastique de l'Oxyde Pb_3O_4. P. GARNIER, G. CALVARIN AND D. WEIGEL. Laboratoire de Chimie/Physique du Solide, Universite de Paris-Nord et Ecole Centrale des Arts et Manufactures, 92290 Chatenay-Malabry, France. About 20 X ray powder diagrams were recorded in the range 30–295°K, by means of a prototype diffractometer and a high-efficiency cryostat, so that a very precise study of the anisotropic structural evolution of lead oxide Pb_3O_4 could be made. The cell parameters, the volume and the principal thermal expansion coefficients have been computed. On the thermal expansion curves, anomalies are observed at 225 and 170°K. Assumptions about the mechanism of the transitions are expressed.

Influence de l'Insertion des Groupements Anioniques MO_4^{n-} sur les Proprietes Cathodochromiques et Photochromiques des Sodalites. A. LEVASSEUR, F. GUILLEN, C. FOUASSIER, AND P. HAGENMULLER. Laboratoire de Chimie du Solide du C. N. R. S., Universite de Bordeaux I, 351 cours de la Liberation, 33405 Talence, France. AND J. M. GUTIERREZ AND J. P. GALVES. Groupement Tubes Electroniques, Thomson-C. S. F., 38120 Saint-Egreve, France. The influence of MO_4^{n-} (where M = P, S, Cr, Mo, or W) upon the cathodochromic properties of sodalites $Na_{4-x+ny}(AlSiO_4)_3X_{1-x}(MO_4)_y$ (X = Cl, Br, I) has been investigated. The coloration contrast is increased in presence of PO_4^{3-}, SO_4^{2-}, and WO_4^{2-} anions. The energy levels of the anionic groups have been obtained from the photochromic behavior and they vary inversely with their oxidation power. An improvement of the cathodochromic properties is observed only when they lie above the valence band.

Influence of Charge-Compensating Ions on the Luminescence of Vanadium-Activated Sulfates. G. BLASSE AND G. P. M. VAN DEN HEUVEL. Physical Laboratory, Sorbonnelaan 4, Utrecht, The Netherlands. Samples $CaSO_4$-V^{5+},Me^{3+} show mainly unassociated-vanadate emission if Me^{3+} is smaller than the Ca^{2+} ion and mainly associated-vanadate emission if Me^{3+} is about as large as the Ca^{2+} ion. Samples $MgSO_4$-V^{5+},Me^{3+} show efficient yellow emission at room temperature.

The Structures of Fluorides. XIII. The Orthorhombic Form of Tungsten Hexafluoride at 193°K By Neutron Diffraction. J. H. LEVY, J. C. TAYLOR, AND P. W. WILSON. Australian Atomic Energy Commission, Research Establishment, Sutherland, N. S. W., 2232, Australia. The positional parameters in the orthorhombic phase of solid tungsten hexafluoride WF_6 have been determined by total profile analysis of a neutron powder pattern taken at 193°K. WF_6 at 193°K is orthorhombic, with space group *Pnma* (D_{2h}^{16}) and $a = 9.603(3)$, $b = 8.713(4)$, and $c = 5.044(3)$ Å at 193°K. The full-matrix least-squares refinement converged at $R = \Sigma(|y_0\text{-}(1/c)y_c|)\Sigma y_0 = 0.075$, where c is the scale factor and y_0 is one of the 306 background-corrected intensities in range of one or more Bragg reflections along the pattern. The refinement showed that at this temperature WF_6 has the orthorhombic UF_6 structure. The mean W–F distance is 1.81 Å, and the mean F–F separation between octahedra is 3.12 Å. The results are compared with previous neutron profile studies of the orthorhombic phases of UF_6 and MoF_6 at 193°K, and with a neutron profile Kubic Harmonic analysis of the cubic form of WF_6 at 266°K. On the basis of these structural studies in this series of hexafluorides, reasons are given why MoF_6 and WF_6 have a high-temperature cubic phase, but UF_6 does not. Deviations from idealised h.c.p. coordinates in the orthorhombic phases are in a direction such that the fluorine atoms become strongly bonded to the metal atoms to form a molecular, rather than an ionic, lattice.

Preparation and Characterization of New Ternary Compounds in the System BaO–TiO_2–Al_2O_3. J. P. GUHA AND D. KOLAR. Institute Jožef Stefan, University of Ljubljana, Ljubljana. AND B. VOLAVŠEK. College of Chemistry, Maribor, Yugoslavia. Three new ternary compounds, $BaTi_5Al_2O_{14}$, $BaTiAl_6O_{12}$, and $Ba_3TiAl_{10}O_{20}$ have been identified in the system BaO–TiO_2–Al_2O_3 and were characterized by X ray powder diffraction. $BaTi_5Al_2O_{14}$ has a tetragonal unit-cell with $a = 7.025$ Å, $c = 10.156$ Å, and $Z = 2$. The compound melts incongruently at 1500°C. $BaTiAl_6O_{12}$ has also a tetragonal unit-cell with $a = 10.07$ Å, $c = 9.107$ Å, and $Z = 4$. The compound melts incongruently at 1560°C. $Ba_3TiAl_{10}O_{20}$ has an orthorhombic unit-cell with $a = 14.854$ Å, $b = 11.356$ Å, $c = 4.986$ Å, and $Z = 2$. The compound dissociates in the solid state at 1440°C to yield $BaTiAl_6O_{12}$ and $BaAl_2O_4$.