Studies of Layered Uranium (VI) Compounds. V. Mechanisms of Densification of Hydrogen Uranyl Phosphate Tetrahydrate (HUP): Pressure-induced Planar Glide, and Solution Phase Sintering. PETER E. CHILDS, ARTHUR T. HOWE, AND MARK G. SHILTON, Department of Inorganic and Structural Chemistry, University of Leeds, Leeds LS2 9JT, England. The good proton conductor $HUO_2PO_4 \cdot 4H_2O$ (HUP) can be easily fabricated into disks or films suitable for use in electrochromic displays, fuel cells, or batteries. Kinetic studies of the room-temperature densification reveal the presence of two mechanisms. At applied pressures of 20 MN m^{-2} the observed rapid densification was attributed to the gliding of the structural layers over each other to achieve essentially 100% of the theoretical density. When the powder had been wetted by solution, slow sintering occurred even in the absence of applied pressure, and we attribute this to a solution-phase sintering mechanism. The study is one of the few to be reported on platelet-shaped crystals rather than the usual spherical-shaped particles. This fact, together with the ease of cleavage of the layers, largely accounts for the excellent fabrication properties. The optimum conditions for pressing large clear robust disks are described.

Electrical Conductivity as a Method to Study Kinetics of Solid-State Reactions. JERZY HABER AND IRENA OŁOŃSKA-KOZŁOWSKA, Institute of Catalysis and Surface Chemistry, ul. Niezapominajek, 30–239 Kraków, Poland. The model of changes of electrical conductivity in the course of solid-state reaction has been demonstrated well describing the changes of the electrical conductivity of the reacting mixture $ZnSe + Cr_2Se_3$. The measurement method, the experimental data, and the results calculated from the formulas derived in a previous publication have been presented. The experimental and theoretical curves of the temperature dependence of the electrical conductivity have a similar shape. The theoretical values differ little from the experimental ones. These differences allowed us to estimate the character of the changes of the concentration of defects in the product in the course of the reaction. Analysis of the assumptions and the application of the formulas previously presented was made.

Chemical Stability of Complexes of Iodine with 2,2-Diphenyl-1-picrylhydrazyl and Naphthalene. S. ARONSON, J. KLAHR, AND L. STEMP, Department of Chemistry, City University of New York, Brooklyn College, Brooklyn, New York 11210. Iodine vapor pressure data were obtained on the solid complex formed between 2,2-diphenyl-1-picrylhydrazyl and iodine and on liquid solutions of naphthalene and iodine. The solidus–liquidus curve for naphthalene–iodine was determined. Electrical conductivity measurements were made on 2,2-diphenyl-1-picrylhydrazyl–iodine liquid solutions. The results of this study are compared to data previously obtained on complexes of iodine with polynuclear aromatic hydrocarbons.