2H–NbS_2 electrodes with hydrated main group and transition metal ions reveals analogous behavior; the formation of higher-stage intermediates is supposedly correlated with stable electronic layer states. Influence of kinetic factors is observed for larger guest cations such as transition metal complexes and organic ions. CdI_2-type host lattices with an octahedral environment of intralayer cations show different reaction pathways, although the occurrence of intermediate states (at least in the nucleation phase) can be demonstrated. It is concluded that the presence of ordered intermediate states is a general phenomenon in topotactic electrode processes of layered dichalcogenides.

Electronic Properties of Semiconducting Cd_2GeO_4. E. R. WHIPPLE, S. N. SUBBARAO, AND F. P. KOFFYBERG. Department of Physics, Brock University, St. Catherines, Ontario L2S 3A1, Canada.

Cd_2GeO_4 has been prepared from CdO and GeO_2 by solid state reaction at 850°C as a low-resistivity ($\rho \simeq 1\ \Omega$-cm) n-type semiconductor. Its conductivity is increased by doping with trivalent metal ions and decreased by heating in oxygen. The electrons originate from shallow donors and their mobility is determined by a combination of large polaron formation and impurity scattering. From photoelectrolysis data the band gap is determined to be indirect, at 3.15 eV; the first direct transition occurs at 4.1 eV. The relations among conditions of preparation, defect structure, and carrier concentration have been examined, but the available data do not allow an unambiguous identification of the nature of the donor center.

Uber geordnete Perowskite mit Kationenfehlstellen. V. Verbindungen der Zusammensetzung $A_2^{2+}B^{3+}U_{5/6}^{6+}\square_{1/6}O_6$. G. RAUSER UND S. KEMMLER-SACK. Institut für Anorganische Chemie der Universität Tübingen Aug der Morgenstelle 18, D-7400 Tübingen, Germany.

Ordered perovskites with octahedral vacancies could be obtained for a new series of composition $A_{12}^{2+}B_6^{3+}M_5^{6+}\square O_{36} \equiv A_2^{2+}B^{3+}M_{5/6}^{6+}\square_{1/6}O_6$ for $M^{6+} = U$ and $A^{2+} = Ba$; $B^{3+} =$ Sm–Lu, Sc, Y, or $A^{2+} =$ Sr; $B^{3+} =$ Yb, Lu. With the exception of the cubic 1 : 1 ordered $Ba_{12}Sc_6U_5\square O_{36}$ the perovskites crystallize in distorted orthorhombic structures. For the type $A_{12}^{2+}B_6^{3+}M_5^{6+}\square O_{36}$ the cation/vacancy ratio (for the octahedral sites) is 11 : 1. This value integrates into the scheme of perovskites with octahedral vacancies and cubic stacking of the AO_3 sheets, where compounds with cation/vacancy ratios of 5 : 1, 7 : 1, 9 : 1, and 15 : 1 are already known.

Preparation and Characterization of Compounds of the System $Fe(Sb_{1-x}Te_x)_2 (0 \leq x \leq 1.0)$. G. YAMAGUCHI, M. SHIMADA, M. KOIZUMI, AND F. KANAMARU. The Institute of Scientific and Industrial Research, Osaka University, Suita, Osaka 565, Japan.

The complete solid solution of $Fe(Sb_{1-x}Te_x)_2$ with the marcasite structure was synthesized. Electrical and magnetic measurements showed that the substitution of tellurium for antimony in the diamagnetic semiconductor $FeSb_2$ resulted in metallic and paramagnetic behavior in the composition range $0.1 \leq x \leq 0.3$, but in $0.4 \leq x \leq 0.6$ the products belonged to the arsenopyrite structure and were diamagnetic and semiconductive. The samples whose compositions were in the range $0.7 \leq x \leq 1.0$ were semiconductors. Mössbauer effect measurements showed that isomer shift did not change, but the quadrupole splitting changed significantly from 1.28 mm/sec for $FeSb_2$ to 0.50 mm/sec for $FeTe_2$ in this solid solution.

Electrical Transport Properties of a Nonstoichiometric Rare Earth Sulfide, $EuGd_2S_4$. MINEO SATO, GIN-YA ADACHI, AND JIRO SHIOKAWA. Department of Applied Chemistry, Faculty of Engineering, Osaka University, Yamadakami, Suita-shi, Osaka-fu, 565 Japan.

The electrical transport properties of nonstoichiometric $EuGd_2S_4$ prepared by heating under a high vacuum have been investigated. The samples heated were classified into two groups on the basis of their electrical transport behavior. One group consisted of semiconducting materials heated at 1500 and 1600°C, for which the transport mechanism was found to be via electron hopping with activation energies ranging from 0.03 to 0.027 eV. Another group consisted of metallic materials heated at 1700 and 1800°C. Their electrical transport was carried out through ordinary band conduction over the measured temperature range except at temperatures lower than 120°K, where hopping with a very small activation energy (~ 0.0035 eV) occurred predominantly.