

ABSTRACTElectrical Transport and Optical Properties of Inorganic  
Complexes in the Solid State

The study of electrical transport and optical properties of inorganic solids is an attractive field of investigation, having a direct relevance to the current experimental and theoretical developments in solar energy conversion and photoelectrochemical cells. The electronics industry and solar energy conversion devices demand new semiconducting materials. The problem of instability of photoelectrodes is still unsolved. It is expected that the solution will eventually come from the development of new inorganic materials.

In this investigation it was hoped to synthesise inorganic complexes and to screen them with the hope of finding semiconducting materials with the above properties. The diffuse reflectance and electrical conductivity studies were carried out for nearly twenty complexes each having a transition metal ion as part of either the anion or the cation. The diffuse reflectance spectra were primarily used to evaluate the band gap of the solid material, and conductivity measurements were used to assess the semiconducting properties. Electrical property studies showed that most of the tested materials were semiconductors. Investigations of the optical properties were found to be consistent with those of the electrical properties.