ABSTRACT

The latest trends in developing new semiconductor technologies visualize the need for different classes of materials in the various fields of electronics and technological applications. Organic semiconductors are one such group of materials which are investigated for its electrical properties in the last two decades. Phthalocyanines are p-type organic semiconductors with the characteristic properties of low mobility and low carrier concentrations. The electrical properties of thin films and the electrical characteristics of Schottky devices fabricated of Iron phthalocyanine (FePc), Magnesium phthalocyanine (MgPc) and Nickel phthalocyanine (NiPc) with different electrode materials are investigated in this thesis. Thermal evaporation technique is used for the device fabrications. The dependence of film thickness, substrate temperature and annealing on the electrical conduction properties of planar thin films are studied. The behavior of electrode materials on the electrical characteristics and the nature of electrical transport in the Schottky device fabricated with FePc, MgPc and NiPc are investigated with various electrode combinations. The effect of oxygen and iodine doping on the various electrical properties of the Schottky devices are also investigated.

Keywords: Schottky diodes, Phthalocyanines, Organic semiconductors, Thin films, Device Characteristics.