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Optical Properties of Copper- and Manganese-Phthalocyanine Thin Films[1] ANH NGUYEN, THOMAS GREDIG, California State University, Long Beach — Metallo-phthalocyanine-based thin films have been widely used in applications, such as electronic and photonic devices, organic photovoltaic devices, and gas sensors. In these devices, thin films lower the cost and provide mechanical flexibility. The electronic properties are dominated by the energy gaps of the materials. Copper phthalocyanine (CuPc) and manganese phthalocyanine (MnPc) thin films are deposited on cleaned glass substrates by using thermal evaporation at several deposition temperatures. The deposition temperature changes the morphology, grain size, surface roughness, and structural properties of the thin film. Here, the optical properties are characterized. The energy band gap is measured from the optical spectrum of the transmission data. The fundamental energy band gap of MnPc has one gap near 3.6 eV, which is inthe Soret band. In contrast, CuPc thin films show two energy band gaps, both in the Soret band region at 3.05(5) eV and in the Q-band region at 1.71(2) eV. For the highest deposition temperatures, the energy band gap of both CuPc and MnPc thin films decreases by about 0.1 eV, which is attributed to structural changes.

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