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Optical Properties of Permalloy Oxide Grown by reactive RF magnetron sputtering YUBO CUI, FIDELE TWAQIRAYEZU, WILHELMUS GEERTS, Department of Physics, Texas State University — Permalloy oxide (PyO) is being studied to be applied in hematite based water splitting cells, shows promise to be applied in resistive random access memory devices, and has shown to increase the performance of spin valve hard disc reading heads. In this research, we investigated the optical properties of PyO thin films grown on quartz and Si/SiO₂ substrates. A series of different samples was made as a function of the deposition temperature (24°C-600°C). The PyO was deposited in an AJA Magnetron System using a gas flow of 10 sccm (20% O₂), and 240w RF power. The substrate was rotated at 60rpm during deposition. The optical properties were measured by a Woollam M2000 variable angle spectroscopic ellipsometer at 8 different angles (50° ~ 85°) from 200-1000 nm. The optical properties and the thickness were calculated in two steps. First a single peak Cody-Lorentz model was used to estimate the optical properties. This result was used as a start for a Bspline model to calculate the thickness and optical spectra of PyO. The MSE of the fits are below 4. The spectrum shows peaks around 2.4, 4, and 5 eV. The peaks of the spectra calculated from the thin films on Si/SiO₂ are less sharp. The estimated thickness is in agreement with the sputter rate measured by a crystal thickness monitor.

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