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IR Ellipsometry on RF sputtered Permalloy Oxide thin films¹ YUBO CUI, WILHELMUS GEERTS, FIDELE TWAGIRAYEZU, Department of Physics, Texas State University, San Marcos, TX 78666, STEFAN ZOLLNER, Department of Physics, New Mexico State University, Las Cruces, NM 88003 — Recently several electronic devices have achieved significant enhancements that have been attributed to an oxidized NiFe layer. A study on lateral spin valves, was found to have an increased magnetoresistance after leaving it exposed to air. The enhancements were attributed to the partly oxidation of a NiFe layer. Even more recently the turn on voltages of Hematite based water splitting devices was lowered to record low of .61 V with the addition of an amorphous NiFeOx layer. We investigated the optical properties of Ni80Fe20-oxide thin films that were deposited by reactive RF sputtering on quartz and Si/SiO2 substrates. Deposition was performed in an AJA Magnetron System using an Ar gas flow of 8 sccm and an oxygen gas flow of 2 sccm for different substrate temperatures (24-600 degrees Celsius). The optical properties in the visible spectrum and the film thickness were measured using a Woollam M2000 variable angle spectroscopic ellipsometer. Additional measurements were performed with a Woollam IR-VASE from 1.7 to 30 micrometer. The measurement results show the existence of a phonon peak around 382 cm^{-1} slightly red-shifted from the 390 cm^{-1} phonon peak of single crystalline NiO. XRD spectra did only reveal X-ray peaks of the rocksalt structure.

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