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**Correlation between Growth Dynamics and Optical Properties of Gadolinium Doped Indium Tin Oxide Thin Films** DANIEL HIRT, WILL RIFFE, SCOTT BENDER, DAVID LAWRENCE, COSTEL CONSTANTIN, James Madison University — Indium Tin Oxide (ITO) semiconductor family is widely used across the electronic industry as touch-screen material because of its high electrical conductivity and high transparency. The goal of our project is to investigate the correlation between growth dynamics and optical properties of Indium Tin Oxide (ITO) and Gadolinium doped ITO (Gd-ITO) thin films which were deposited with Direct-Current Magnetron Sputtering. These films were deposited at room-temperature and they were opaque as removed from the growth chamber, however, after annealing them in air and inert atmosphere, the films became transparent. To measure optical properties such as index of refraction ( $n$ ), extinction coefficient ( $k$ ), and band gap ( $E_g$ ) we used variable angle spectroscopic ellipsometry (VASE) and UV-Vis transmission spectroscopy. We model our data by using both VASE and UV-Vis and compare it with data only modeled by using VASE.

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