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Optimization of Aluminum-doped Zinc Oxide as a Transparent Conducting Oxide TRISTAN CABRERA, STEPHEN HOOD, HASITHA MAHABADUGE, Department of Chemistry, Physics and Astronomy, Georgia College State University, — Transparent conducting oxide (TCO) thin films are extensively used in optoelectronics. This study focuses on the optimization of aluminum-doped zinc oxide (AZO) as a TCO for photovoltaic applications. AZO thin films were fabricated using RF magnetron sputtering in the argon environment and characterized using UV-Vis spectroscopy, X-ray diffraction, Hall measurements and four-point probe. The effects of substrate temperature, deposition pressure, and power on the properties of AZO were studied. Using a deposition pressure of 10 mTorr, deposition temperature of 250 C, and 60 W RF power, optical transmittance of up to 90% in the visible range was achieved along with a resistivity in the order of $10^{-4} \Omega \text{ cm}$. The measured properties are among the most optimal reported for AZO thin films.

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