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Optical and Microstructural Properties of Sputter-Deposited Ga_2O_3 Films. EDUARDO VEGA, SUNDAR ISUKAPATI, TOM ODER, Youngstown State University — Gallium oxide (Ga_2O_3) thin films were deposited on c-plane sapphire substrates by radio frequency magnetron sputtering technique. The deposition gas composition, substrate temperature and post-deposition annealing temperature were varied to optimize the films. Composition and structural properties were studied by energy dispersive spectroscopy (EDS) and X-ray diffraction (XRD). Results indicate that films deposited at 400 ^{o}C in argon possess diffraction peaks at 18.6 ^{o}, 37.2 ^{o}and 58.2 ^{o}, which belongs to the (- 2 0 1), (-4 0 2) and (-6 0 3) planes of monoclinic gallium oxide (β-Ga_2O_3). The optical characteristics obtained by UV-VIS spectroscopy measurements showed excellent transmission of 90 - 95%. Post-deposition annealing in N_2 at temperatures below 500 ^{o}C did not make any significant improvement in the crystal structure of the films. Addition of tin dopant in the films produced transparent films whose optical bandgaps decreased with increasing dopant concentration in the films.

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