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Optical Characterization and Superconducting Behavior of MgB2 Thin Films JAFAR AMIRZADEH, Institute for Superconductivity at University of South Carolina, Columbia, SC, MICHAEL BLEIWEISS, Naval Academy Preparatory School, Newport RI, MING YIN, Benedict College, Columbia, SC, TIMIR DATTA, Institute for Superconductivity at University of South Carolina, Columbia, SC — MgB_2 thin films were sequentially deposited from pure metal sources on optically transparent glass. The resulting films were investigated by SCEM, optical microscopy, EDAX, and by optical transmission. As deposited multilayer films show high metallic reflectivity in 400 – 1000nm regime with very little transmission. After *ex situ* annealing (525, 550, 575 & 600°C) the films appeared progressively less shiny and took up darker hues. The films rendered superconducting after annealing at 550°C with Tc of 38K, approaching that of the bulk material. Also, upon reaction a direct band gap opened up. For all the films absorption coefficient alpha and photon energy followed a Tauc behavior rather than a Cody type behavior. As annealing temperature was raised the Tauc plot slope was observed to decrease monotonically. However the band gap first increased to a maximum of 2.5eV (550° C) and then rapidly decreased to below 0.5 eV with 600° C anneal. Our results indicate that MgB_2 films have excellent optical properties and are commensurate with VLSI and optoelectronics processing.

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