

**INVESTIGATION OF THE ELECTRICAL PROPERTIES OF E-BEAM
EVAPORATED SiO_2 AS A FUNCTION OF DEPOSITION PARAMETERS
SUCH AS OXYGEN FLOW, BIAS VOLTAGE, AND DEPOSITION RATE.**

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For most applications, silicon dioxide (SiO_2) is grown via thermal oxidation of silicon at elevated temperatures (900-1100C). However, certain applications desire the use of methods that require low temperature processes. One of the common deposition methods is electron beam (e-beam) evaporation of SiO_2 . The e-beam is used to heat the source material in vacuum until it evaporates. The evaporated material makes contact with the substrate, forming a thin film or coating. The purpose of this investigation is to obtain a thin film with insulating properties comparable to those of thermally grown films. In order to investigate the electrical properties of e-beam SiO_2 , films were deposited using standard conditions. The e-beam SiO_2 originally obtained did not show the characteristics expected of stoichiometric films. A film with 100nm of SiO_2 should start conducting at 60V, since SiO_2 has the breakdown strength of 6MV/cm. Instead, these films started to conduct around 10V, which indicated that they were silicon rich. In order to make the e-beam SiO_2 a better insulator, changes were made in the following deposition parameters: oxygen flow, bias voltage and deposition rate. The characterization, results and analysis of the experimental matrix will be presented.