

Title: Deposition and Characterization of (Ba,Sr)TiO₃ for High-Permittivity Applications

Type: Student

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Description: Thin films of (Ba,Sr) TiO₃ (BST) have been extensively investigated as high-permittivity materials for microelectronics applications such as dynamic random access memory (DRAM) and advanced packaging components. By controlling the bottom electrode, electrode/film interface, and film stoichiometry and structure, the dielectric properties of the film can be tailored. In this study, BST thin films will be deposited by metalorganic chemical vapor deposition (MOCVD) at low temperatures (500-575°C) using liquid delivery of metalorganic β-diketonate precursors on Pt/Ti/Si(100), Pt/Cr/Si(100), and MgO(100) substrates. A high dielectric permittivity of $\epsilon_r \geq 1500$ and low leakage current density of $J_L < 10^{-5} \text{ A/cm}^2$ are desired.