

Low-temperature crystallized BST thin films by excimer laser annealing for embedded RF tunable capacitor

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Abstract : This study realized low-temperature crystallization process of the $Ba_{0.6}Sr_{0.4}TiO_3$ (BST) thin films without thermal damage of substrate using excimer laser annealing (ELA) and structural and electrical characteristics were investigated. The amorphous BST thin films were prepared on Pt/Ti/SiO₂/Si substrate by sol-gel method at 250 °C. The ELA was carried out using KrF excimer laser which provided excitation wavelength of 248 nm. The beam homogenizing system was used in order to homogenize beam shape of Gaussian fit. The XRD and SEM were used to analyze structural characteristics and the microwave capacitance, dielectric loss and tunability of the BST films were measured by a symmetrical stripline resonator method with shorted end. Consequently, the crystallinity of BST thin films were improved after ELA process and RF tunable capacitor was demonstrated at low temperature below 300 °C.

Key Words : Excimer laser annealing, BST, thin film, tunable capacitor

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