

Excimer laser annealing of sol-gel derived PZT thin films

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Abstract : The effect of excimer laser annealing on the structural and dielectric behaviors of $\text{PbZr}_{0.52}\text{Ti}_{0.48}\text{O}_3$ (PZT) thin films has been investigated. The amorphous PZT thin films were prepared on Pt/Ti/SiO₂/Si substrates by a sol-gel method. The PZT precursor was prepared from lead acetate, zirconium acetylacetonate, and titanium isopropoxide. The starting materials were dissolved in n-propanol and 1,3-propanediol. After, the amorphous PZT thin films were laser-annealed (using KrF excimer laser) as a function of the laser energy density and the number of laser pulse. Structural properties of PZT thin films are characterized by using X-ray diffraction (XRD) and scanning electron microscopy (SEM). The dielectric characterization was done on a RT66A test system and a Agilent 4294A impedance analyzer. The PZT thin films show that excimer laser irradiation drastically improved the crystallization and dielectric properties of the PZT thin films, depending on the energy density and the pulse number.

Key Words : Excimer laser annealing, PZT, Dielectric, Sol-gel

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