

High-dielectric-tunability of ferroelectric (Pb,Sr)TiO₃ thin films on (001) LaAlO₃

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Ferroelectric (Pb,Sr)TiO₃ (PSTO) thin films were epitaxially grown on (001) LaAlO₃ (LAO) by using pulsed laser deposition. Microstructural characterizations with x-ray diffraction and transmission electron microscopy indicate that the as-grown films have excellent single crystalline quality and a (001)_{PSTO}//(001)_{LAO} and [100]_{PSTO}//[100]_{LAO} interface relationship. Dielectric property measurements reveal that the as-grow films have a very high dielectric constant value of 3100 and very large dielectric tunability of 48% at 40 V/cm at room temperature. These excellent results suggest that the highly epitaxial ferroelectric (Pb,Sr)TiO₃ thin films can be developed for room-temperature tunable microwave elements in wireless communication applications. © 2004 American Institute of Physics. [DOI: 10.1063/1.1801176]

Ferroelectric materials with room temperature high dielectric constant, low dielectric loss, and large electrical tunability have extensively been studied in the past several years

and Sr in the compound. Earlier studies indicated that the dielectric constant can reach 15 000 and the Curie temperature varies from 5 to 770 K.⁸ The dielectric constant and