

Pr_{0.67}Ba_{0.33}MnO₃ in bulk and thin film ceramic

ABSTRACT

Bulk polycrystalline of Pr_{0.67}Ba_{0.33}MnO₃ (PBMO) ceramic prepared via solid-state reaction and converted into thin films on corning glass, fused silica and MgO (100) by pulsed laser deposition (PLD) technique. As compared to bulk PBMO, the unit cell in thin film PBMO experienced positive misfit due to lattice strain induced by substrate used resulting MnO₆ to deform (change in Mn-O-Mn bond angle and Mn-O bond length). Bulk PBMO had large grains (~1.5 μm) as compared to thin film which are nano-sized (<100 nm). Two metal-insulator transition temperatures, T_P (156 K and 190 K) were observed in bulk due to core-shell effect as proposed by Zhang et al.. In summary, variation of electrical behaviour was observed between bulk and thin film samples which believed to be due to the difference of ordering in core (body) and grain surface.

Keyword: Colossal magnetoresistance; Lattice strain; Manganites; Polycrystalline and thin film