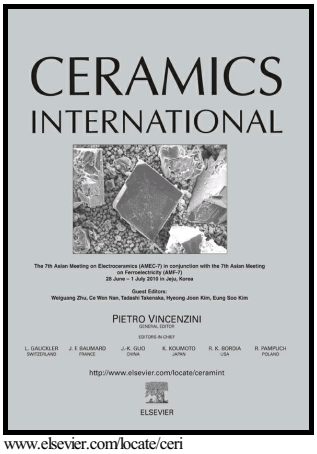

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Effect of neodymium substitution on crystalline orientation, microstructure and electric properties of sol-gel derived PZT thin films

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Abstract

$Pb(Nd_xZr_{0.52}Ti_{0.48})O_3$ (PNZT) (x=0%, 1%, 2%, 3%, 4%, 5%) thin films were prepared by sol-gel process to investigate the effects of neodymium substitution on crystalline orientation, microstructure and electric properties of lead zirconate titanate (PZT) films. X-ray diffraction (XRD) and scanning electron microscope (SEM) analysis showed that PNZT films with Nd doping concentration below 3% exhibited dense perovskite structure with (100) preferred orientation. The average grain size of PNZT films decreased as the Nd substitution increased. The maximum dielectric constant, remnant polarization and minimum coercive field were obtained in 2% Nd-doped PZT films. Fatigue resistance was also improved significantly with 2% Nd dopant.

Keywords: PNZT thin films; (100) preferred orientation; microstructure; electric properties; sol-gel process.