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PII: S0272-8842(18)30212-8  
DOI: <https://doi.org/10.1016/j.ceramint.2018.01.197>  
Reference: CERI17329

To appear in: *Ceramics International*

Received date: 3 January 2018  
Revised date: 23 January 2018  
Accepted date: 23 January 2018

Cite this article as: Qi Li, Xing Wang, Fuan Wang, Da Chen, Xiaolei Xiao and Helin Zou, Effect of neodymium substitution on crystalline orientation, microstructure and electric properties of sol-gel derived PZT thin films, *Ceramics International*, <https://doi.org/10.1016/j.ceramint.2018.01.197>

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Abstract

$\text{Pb}(\text{Nd}_x\text{Zr}_{0.52}\text{Ti}_{0.48})\text{O}_3$  (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.

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