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# DIELECTRIC AND PIEZOELECTRIC PROPERTIES OF PMN-PT CERAMICS DOPED WITH STRONTIUM

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## Abstract

Motivated by the need of piezoelectric ceramics with enhanced piezoelectric properties, we investigated the effects of Sr addition on the structural, dielectric and piezoelectric properties of PMN-PT ceramics. The synthesis of  $(1-x)[(\text{Pb}_{1-y}\text{Sr}_y)(\text{Mg}_{1/3}\text{Nb}_{2/3})\text{O}_3]-x(\text{Pb}_{1-y}\text{Sr}_y\text{TiO}_3)$  (PsMN–PsT) ( $y$ : 0 - 0.10,  $x$ : 0.35 – 0.40) ceramics was carried out by the colloidal coating method to distribute Sr uniformly in PMN and PT respectively. When  $x=0.35$ , it was found that  $y=0.02$  gave the optimal piezoelectric properties. Furthermore, by keeping  $y=0.02$  and varying  $x$ , it was found that  $x=0.37$  gave even better piezoelectric properties with the optimal piezoelectric strain coefficient  $d_{33}$  (630 pC/N), piezoelectric coupling factor  $k_p$  (0.52), dielectric constant  $\epsilon_r$  (4000), and Curie temperature  $T_c$  (210 °C), exhibiting great potential for actuator and sensor applications.

Keywords: Piezoelectric properties; Dielectric properties; PMN-PT; Isovalent doping; Coating method.

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