

Hysteresis and electromechanical properties Property of Ceramics in PMN-PZT System

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Abstract

In this study, hysteresis and electromechanical properties of ceramics in PMN-PZT system, are investigated. The ceramics with the formula $(1-x)\text{Pb}(\text{Mg}_{1/3}\text{Nb}_{2/3})\text{O}_3$ – $(x)\text{Pb}(\text{Zr}_{0.52}\text{Ti}_{0.48})\text{O}_3$ or $(1-x)\text{PMN}$ - $(x)\text{PZT}$ when $x=0.0, 0.1, 0.3, 0.5, 0.7, 0.9$ and 1.0 are prepared by a conventional mixed –oxides method. The specimens are then poled at appropriate conditions before properties measurements. The hysteresis properties of the ceramics are measured with a Sawyer-Tower circuit. When the loops are compared, it is shown very clearly that the hysteresis behavior gradually changes from piezoelectric in PZT to electrostrictive in PMN. The d_{33} -meter is utilized in obtaining the electromechanical coupling, e.g. d_{33} . The results show the maximum d_{33} value in PZT with decreasing d_{33} value when PMN is added into the ceramic system.