

Thermal Effects on Domain Orientation of Tetragonal Piezoelectrics Studied by In-situ X-ray Diffraction

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Thermal effects on domain orientation in tetragonal lead zirconate titanate (PZT) and lead titanate (PT) have been investigated by using in-situ X-ray diffraction (XRD) with an area detector. In the case of a soft PZT, it is found that the texture parameter called multiples of a random distribution (MRD) initially increases with temperature up to approximately 100°C and then falls to unity at temperatures approaching the Curie temperature, whereas the MRD of hard PZT and PT initially undergoes a smaller increase or no change. The relationship between the mechanical strain energy and domain wall mobility with temperature is discussed.

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