

Lead enrichment at the surface of lead zirconate titanate thin films

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Abstract

Ferroelectric thin films have been investigated intensely by many researchers over the past decade, but some important phenomena that influence the electrical properties have been overlooked. This work addresses the lead enrichment, which is observed on the surface of lead zirconate titanate films.

The XPS compositional profiles of PZT films prepared using different thermal

treatments are presented and correlated with the preparation conditions.

The segregation profiles are explained in terms of a simple oxidation model that induces the diffusion of lead to the surface. The ionic diffusion also induces self-polarisation, commonly seen in ferroelectric films. The implications on the electrical properties of ferroelectric films, particularly, imprint of the polarisation state, are also discussed.