Pulse characterization of antiferroelectric $PbZrTiO_3$ thin films

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Abstract

Antiferroelectric $PbZrTiO_3$ thin films were prepared by Chemical Solution Deposition and spin-coated onto RuO_2 coated metal substrates. The field induced transition from the antiferroelectric (AFE) to the ferroelectric (FE) phase and the spontaneous AFE-FE relaxation were investigated in PZT (95/5) thin films by applying fast rising voltage pulses in unipolar or bipolar sequences. The transition between the two phases can be described from the voltage and phase transition current wave forms, respectively, and the transition fields can be deduced from these curves. The data from the pulse transition experiments were used to trace a "pulse hysteresis loop" which is compared to the classic double hysteresis loop obtained by a Sawyer-Tower circuit. The influence of the applied voltage and of the Zr/Ti ratio on the phase transitions dynamics is discussed.

Keywords: Sol-gel processes; Films (A); Ferroelectric properties (C); PZT (D); Functional applications (E)

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