Abstract Submitted
for the MAR05 Meeting of
The American Physical Society

New Candidate for FRAM Dielectric LayerRare Earth Europium Doped PZT Thin Films Y.J. YU[1], Materials Physics and Chemistry Department, Harbin Institute of Technology, China, Y.M. LI, Applied Chemistry Department, Harbin Institute of Technology, China, H.L.W. CHAN, Applied Physics Department, the Hong Kong Polytech University, Hong Kong — Europium (Eu) doped lead zirconium titanate (PZT) ferroelectric thin films (PEZT) were grown on platinized Si substrates by a sol-gel technique with a rapid thermal process. Based on the analysis of TEM and AFM, an obvious modification of PZT films by Eu doping was observed. Compared with undoped PZT, PEZT films show 5 times larger size of grains (100 nm) but only 15% increase in roughness mean square (about 1.08 nm). That is, PEZT films with high quality (large grain size and good uniformity) were fabricated under the same processing condition as pure PZT, in no charge of long-time and high-temperature. The high quality PEZT dielectric layer could greatly improve the performance, mainly the reliability and the reproducibility of FRAM units. Furthermore, increased remenant polarization and improved polarization fatigue properties were found by optimizing Eu doping content. Mechanism of Eu doping effects on the microstructure and electrical properties of PZT films was discussed from the physics of crystal growth and the defect chemistry points of view.

[1]Present affiliation: Shanghai Institute of Microsystem and Information Technology, China

Y.J. Yu
Materials Physics and Chemistry Department
Harbin Institute of Technology, China

Date submitted: 22 Nov 2004 Electronic form version 1.4