

# Polaronic Defects in Barium Titanate Films: Evidence from Electron Paramagnetic Resonance

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## Abstract

POLARONIC DEFECTS IN BARIUM TITANATE FILMS: EVIDENCE FROM ELECTRON PARAMAGNETIC RESONANCE

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Barium titanate (BTO) films are being actively considered as storage capacitors in dynamic and ferroelectric random access memory (DRAM and FRAM). Since impurity and intrinsic lattice defects may crucially influence on materials properties, ESR as a local method, have been applied to get information on these defects. In our report we present results of EPR investigation of (h00) and (hh0) orientated BaTiO<sub>3</sub> thin films sputtered on amorphous Si substrate with different thickness. To the best of our knowledge this is a first investigation of BTO films by EPR method. In both series of the samples EPR spectra originated from titanium related paramagnetic centers: Ti<sup>3+</sup> small polarons and/or axial Ti<sup>3+</sup> - V(O) with oxygen vacancy along  $[100]_c$  direction have been identified. The g-factor values, which are close to that in BaTiO<sub>3</sub> single crystal, and temperature dependence of EPR intensity confirms the model of the Ti<sup>3+</sup> center. The influence of the revealed paramagnetic centers on dielectric properties of the BTO films is discussed as well.