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Fabrication of $BaTiO_3$ thin films through ink-jet printing of TiO_2 sol and soluble Ba salts

Abstract

BaTiO3 thin films were prepared by ink-jet printing aqueous solutions of TiO2 sol and soluble Ba salts. Higher pH values (pH > 13) as well as higher than stoichiometric Ba (Ba:Ti = 1.1:1) salt additions were required to compensate for the different aqueous solubilities of the Ba and the Ti. Impedance spectroscopy of the samples shows the thin film samples to have similar activation energy with bulk samples prepared through low temperature aqueous synthesis. The relative permittivity of the thin films (~ 280) was lower than the bulk pellets (~ 2750) which was attributed to the lower temperature heat treatment for the thin films.

Keywords — Dielectrics, sol-gel preparation, thin films