

Processing of Dielectric/Ferroelectric Materials for Capacitor Applications

Fatih Dogan

Missouri University of Science and Technology, Rolla, MO, USA

The focus of this tutorial is on the recent developments of dielectric and ferroelectric materials for high energy density capacitors applications. Particular emphasis will be given on nanotechnology and related methods applied for processing of nanostructured ceramic dielectrics as well as composite polymers filled with nanosized inorganic particles. Processing, microstructure and property relationships of various nanostructured dielectrics will be presented towards development of high energy density capacitor. The effect of starting materials and process parameters on the microstructural development and properties of capacitors, such as voltage breakdown and leakage current, will be discussed based on several case studies. The participants of this tutorial will have an opportunity for questions and answers on the advances in nanotechnology and novel processing methods to exceed the performance of state-of-the-art capacitors in the context of energy storage and pulsed power applications.