

Effect of sintering temperatures on the microstructure and dielectric properties of SrTiO₃

ABSTRACT

Conventional solid state reaction method is a common and effective way to fabricate modern ceramics. For ceramic processing, sintering is an important factor that affects the microstructure evolution, thus optimizing its natural abilities. In this work, Strontium Titanate (ST) ceramic samples sintered at different sintering temperatures were prepared and analyzed by X-Ray Diffraction (XRD) and Scanning Electron Microscope (SEM). XRD is used to determine the samples crystallization, while SEM was for microstructure analysis. Dielectric properties of SrTiO₃ samples were measured using Agilent 4291B Impedance/material Analyzer in the frequency range of 1 MHz to 1.5 GHz at room temperature. The dielectric constant is constant with respect to frequency and increased after 1 GHz. Dielectric constant of ST increased with increasing sintering temperatures. ST sintered at 1200°C has the highest dielectric constant of 50. The average grain size increases with increasing sintering temperature.

Keyword: Strontium titanate; Ceramics; Dielectric properties; Sintering temperature; Microstructure; Microwave frequency