Pb(Zr0.53Ti0.47)O3 Thick Films on Low Temperature Cofired Ceramics

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Abstract

Ferroelectric ceramic materials based on solid solutions of Pb(Zr0.53Ti0.47)O3 (PZT) are used in the electronics industry for sensors and actuators and for electromechanical transducers, to name just a few examples. Thick-film technology, i.e. the deposition of thick-film pastes by screen printing primarily on alumina substrates, is a relatively simple and convenient method to produce thicker layers with a thickness up to 100 m. The characteristics of thick-film ferroelectrics are similar to those of bulk materials. Ceramic multi-chip modules (MCM-C) are multilayer substrates with buried conductors lines. For some applications the PZT thick films on LTCC (Low Temperature Cofired Ceramics), which is sintered at relatively low temperatures around 850oC, would be of interest. The aim of this work was to compare the electrical characteristics of PZT thick films with a low sintering temperature, printed and fired on alumina and LTCC substrates. The results, i.e. the measurements of electrical characteristics as well as the microstructural investigations show that the characteristics of PZT films fired on LTCC substrate deteriorate due to the interaction between the LTCC substrate and the PZT. When PZT thick films are fired on prefired LTCC substrates the ferroelectric response is increased in comparison with the PZT films on the green LTCC substrates.