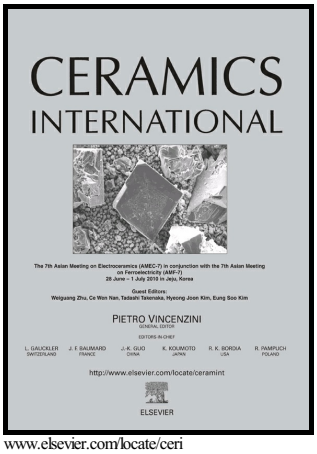

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Perovskite Structure and Low frequency Relaxor- like- Dielectric Response of (Sr,Ce)TiO_3 Solid Solution

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Abstract

Phase composition, structure stability, cations valance state, and relaxor-like-dielectric behavior of $Sr_{(1-3/2x)}Ce_xTiO_3$ (SCT, x = 0.3, 0.4) solid solution were investigated systematically. The $Sr_{(1-3/2x)}Ce_xTiO_3$ samples appear to be single phase within the detection limits of the technique, whereas the solid solution exhibits the higher angle doublet and triplet peak splitting associated with (200) and (321). X-ray photoelectron spectroscopy (XPS) analysis showed that the Ce substitution induces change in the cations valance state upon oxygen vacancies formation. The system exhibits features of low-frequency dependent relaxor-like-dielectric behavior rather than sharp frequency-independent anomalies. Besides this, two kind of relaxations were detected in the temperature range ≥ 350 °C. According to the electric modulus and ac conductivity analysis, the relaxor-like-dielectric behavior results from the long-range conduction associated with ionized vacancies and mixed state of $Ti^{3+/4+}$ and $Ce^{3+/4+}$ cations.

Keywords: Perovskite solid solution; Electric Modulus; Relaxations and dielectric properties