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Structure-property correlations in perovskite oxide materials for potential applications

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Perovskite oxide materials have become the basis of modern scientific and technological inventions. The research on Perovskite materials has accelerated and shown great attention from the past years because of their excellent functional properties for technological applications. These properties can easily be tuned with structure-property correlations. These materials were prepared by using a different method (solid state method, Semi-wet Method and Highly energy ball milling) followed by powder consolidation convectional and Spark plasma sintering under the optimized conditions. Structural, microstructure, and electrical (dielectric, ferroelectric, piezoelectric and thermoelectric) properties were studied systematically. X-ray diffraction (XRD), Raman spectroscopy, Fourier-transform infrared spectroscopy (FTIR) and Field emission scanning electron microscopy (FE-SEM) were used to study the crystal structure, functional groups, and surface morphology respectively. The synthesized oxide materials (Lead-free ceramics/ Nanocomposites) are novel in terms of a commercially viable innovative and indigenously developed by chemical synthesis route adopted and have significant potential for the different applications.

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