

Synthesis, Processing and Characterization of Nanoparticle PLZT

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Research on the synthesis of nanoparticle materials is of great interest to electroceramics because of their unique ability to induce macroscopic properties which differ greatly from those of bulk materials formed from micron sized particles. The performance of certain materials systems can be altered and enhanced due to the combination of the near-atomic size and the dynamic properties of the surface atoms of these nanoparticle powders. The typical result is materials with dielectric, ferroelectric and piezoelectric behaviour that exceeds the capability of materials fabricated from sub-micron to micron sized particle systems. The focus vehicle of this work lies in the synthesis of a nano-scale PLZT powder through an aqueous based chemical precipitation technique that employs a polyvinyl alcohol surfactant to form a semi-dilute polymer solution that controls the inherent size of the resultant particles. The synthesis technique and subsequent characterization of the resultant particle system will be presented.

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