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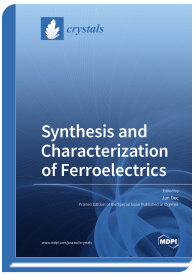
Special Issue Reprint

Synthesis and Characterization of Ferroelectrics



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The Special Issue on “Synthesis and Characterization of Ferroelectrics” reports on several physical properties of ferroelectric materials and their technological aspects. Different substitution mechanisms provide ideas toward future improvement of lead-free (Ba,Ca)(Zr,Ti)O3 piezoelectric ceramics, including the electrocaloric effect, fluorescence, and energy storage. It is established that axial and radial element segregation differently influences electrical properties of 0.68Pb(Mg1/3Nb2/3)0.32PbTiO3 (PMN-32PT for short) single crystals. While the electrical properties along the axial direction strongly depend on the PbTiO3 content, the electrical properties along the axial direction are mainly determined by the ratio of Nb and Mg. On the other hand, Fe-substitution of PMN-32PT crystals lead to an enhancement of the coercive field due to wall pinning induced by charged defect dipoles. It is also found, that capacitors based on Pt/Na0.5Bi0.5TiO3/La0.5Sr0.5CoO3 thin films display good fatigue resistance and retention. Another lead-free thin film capacitor fabricated from Ba0.3Sr0.7Zr0.18Ti0.82 features a low leakage current density and high breakdown strength. Such capacitors are essential for energy storage. Furthermore, an enhanced electrocaloric effect on 0.73Pb(Mg1/3Nb2/3)0.27PbTiO3 single crystals is demonstrated. This effect is promising for novel solid-state cooling systems.

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