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Special Issue Reprint

Ferromagnetic and Ferroelectric Materials: Synthesis, Applications, and Techniques

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Ferroelectric and ferromagnetic materials remain hot research topics for condensed matter physics and material science since they are an attractive realm for developing devices with enhanced functionality based on either their bulk or surface and interface properties. The application prospects in the field of nonvolatile memories, sensors, piezoelectric devices, photovoltaic applications, catalysis, and photocatalysis define new challenges. Such challenges range from defining appropriate models to understanding fundamental mechanisms, which further define their functionality, to analysis methods and investigation techniques allowing one to highlight the relevant contribution of these mechanisms to device performance. The aim of the Special Issue entitled “Ferromagnetic and Ferroelectric Materials: Synthesis, Applications, and Techniques” is to provide updated information regarding novel preparation techniques for ferroelectric and ferromagnetic systems and to understand the physics of ferroelectric and ferromagnetic surfaces in conjunction with emerging theoretical models. We will discuss the theoretical and experimental aspects of different mechanisms and disclose their impact on device functionality. We will focus on the challenges involving material modeling, process engineering, and application in conventional and organic–inorganic multiferroic systems. Theoretical perspectives combined with novel preparation and investigation approaches for ferroic materials, including powders, thin films, heterostructures, ceramics, and composites, will be brought together.

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