Advances in Condensed Matter Physics

Hindawi

Special Issue on

Magnetoelectric Multiferroics: Synthesis, Characterization, Physical Mechanism, and Applications

CALL FOR PAPERS

Multiferroic materials, with coexistence of magnetic and ferroelectricity ordering, have recently attracted intense attention aimed both at understanding the underlying mechanism and at exploiting their potential for multifunctional device applications such as magnetic field sensors, switches, transducers, or new types of memory devices. The magnetoelectric coupling in these materials can be defined as influenced electric polarization (magnetization) by an applied magnetic (electric) field, which can be achieved through the composites and heterostructures or even in single-phase multiferroics.

The single-phase multiferroics are usually divided into two groups: type I and type II multiferroics. In most of the conventional type I multiferroics, the temperature scale for ferroelectric order is much larger than that for magnetic order, and the origins of these orders have no relation to each other, which leads to weak magnetoelectric coupling. The type II multiferroics (related to the so-called spin-driven ferroelectricity) usually exhibit a lower electric polarization, but the ferroelectricity is directly coupled to the magnetic order and therefore a strong intrinsic magnetoelectric coupling can be achieved. Nowadays, more and more new single-phase multiferroics are being discovered.

We invite review and original papers reporting the current progress and the further prospects and challenges to advance this exciting field.

Potential topics include but are not limited to the following:

- New synthesis routes of single-phase multiferroics, composites, or heterostructures
- Characterization of structure, magnetic, dielectric, ferroelectric, and magnetoelectric coupling in multiferroics
- Nanoscale observation on magnetic domain, ferroelectric domain switching, ferroelectric hysteresis loops, and surface potential by scanning probe microscopy (SPM) and/or other facilities
- Neutron and synchrotron x-ray scattering techniques to study the ionic displacement, crystalline and magnetic structures, and lattice or spin dynamics of the multiferroics
- Theoretical calculation to unveil magnetic interactions and the origin of the ferroelectricity in multiferroics: *ab initio* calculation and others
- Technical consideration and exploration for the application of single-phase multiferroics, multiferroic composites, or heterostructures

Authors can submit their manuscripts through the Manuscript Tracking System at http://mts.hindawi.com/submit/journals/acmp/mmscp/.

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