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Polymer-templated chemical solution deposition of ferrimagnetic nanoarrays and multiferroic nanocomposite thin films

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Propositions

accompanying the dissertation

Polymer-Templated Chemical Solution Deposition of Ferrimagnetic Nanoarrays and Multiferroic Nanocomposite Thin Films

Jin Xu

1. Adding cobalt to ferrite nanodots turns them into room-temperature ferrimagnets. (Chapter 3)
2. Standard characterization methods for CFO nanoparticles and CFO thin films have been well established. Applying them to arrays of CFO nanodots, however, can be very challenging. (Chapter 3)
3. GISAXS is a great complementing technique to SEM and TEM, as it reveals the long-range order of nanostructure arrays in a non-destructive fashion. (Chapter 3)
4. Block copolymer templates can provide either structure regularity or array height in oxide nanoarray patterning, whereas imprinted polymer templates combine these two desirable features. (Chapter 3, 4, and 5)
5. Coating ferroelectric polymers on polymer-templated ferrimagnetic oxide arrays is a low-cost and convenient approach to multiferroic thin-film nanocomposites. (Chapter 6)
6. The magnetic-field-assisted ferroelectric switching in the nanocomposites is an indirect proof of magnetoelectric coupling. (Chapter 6)
7. Bridging between disciplines is challenging, but rewarding in the long run.
8. Most of the time pain is not caused by the problems themselves, but by the resistance to accepting them.