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Self-Assembled Epitaxial Multiferroic Nanocomposite Films Prepared by Polymer-Assisted Deposition[1] HONGMEI LUO, HAO YANG, EVE BAUER, T. MARK MCCLESKEY, ANTHONY K. BURRELL, QUANXI JIA, Materials Physics and Applications Division, Los Alamos National Laboratory, Los Alamos, NM 87545 — Multiferroic materials, which show simultaneous electric and magnetic ordering, have attracted considerable interest recently due to their unusual physical properties and potential device applications. Here we demonstrate that a cost-effective chemical solution approach of polymer-assisted deposition (PAD) is a very promising technique to grow self-assembled epitaxial multiferroic nanocomposite thin films: such as $BaTiO_3$-$NiFe_2O_4$ films grown on (001)-oriented $LaAlO_3$ substrate. X-ray diffraction (XRD), atomic force microscopy (AFM) and high resolution transmission electron microscopy (HRTEM) analyses show clear epitaxial relationship between the two phases and the substrate. The ferroelectric $BaTiO_3$ grains are embedded in the ferrimagnetic spinel $NiFe_2O_4$ matrix. The composite films exhibit both ferroelectric and ferrimagnetic properties. The structure and properties will be discussed and compared with the nanocomposite films prepared by pulsed-laser deposition (PLD) method.

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