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Magnetic Nanoparticle Arrays prepared via Coaxial Electrospinning NIKHIL SHARMA, HASSNAIN JAFFARI, ISMAT SHAH, DARRIN POCHAN, University of Delaware — One dimensional nanoparticle (1D NP) arrays display strong anisotropy in their physical properties making them interesting from a fundamental as well as applications perspective. 1D arrays of Fe_3O_4 nanoparticles have been constructed by encapsulating magnetite nanoparticles within Poly(ethylene oxide) nanofibers, by a modified solution spinning process. Electrospinning is a facile process for creating 1D nanostructures and a simple modification to the process renders a coaxial delivery mechanism that facilitates the construction of nanoparticle arrays. These hybrid 1D nanomaterials were structurally characterized by electron microscopy and the magnetic characteristics of these fiber encapsulated particle arrays were studied using vibrating sample magnetometry. Anisotropic magnetic behavior along different orthogonal axes (parallel and perpendicular) was observed even at room temperature with an appreciable increase in coercivity in the perpendicular configuration. Experimental work is underway to use these particle arrays as precursor materials for the creation of magnetite nanorods.

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