Growth and characterization of the La$_{0.67}$Sr$_{0.33}$MnO$_3$ nanowires

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— Conventional electrospinning method provides a simple approach to synthesis polymer nanowires. In this work, we report the growth, structural characterization, and magnetic properties of half-metallic, ferromagnetic La$_{0.67}$Sr$_{0.33}$MnO$_3$ (LSMO) alloy nanowires that are first time grown on Si/SiO$_2$substrates by the electrospinning method. Electrospun nanowires are annealed in an ultra-high purity argon-hydrogen gas mixture. Uniform, continuous, high aspect ratio LSMO nanowires with diameters in the range of 60–300 nm and lengths up to 500 μm are grown. The temperature dependent magnetization behavior of LSMO nanowires shows ferromagnetic behavior, and symmetric hysteresis loops are observed with magnetic fields applied to the substrate at 10 K and 300 K. Finally, we will discuss the spin dependent electrical transport properties of the single LSMO nanowire.

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