

85e Probing the Magnetic Properties of Core-Shell Nanocable Arrays [Invited]

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We report the synthesis of high density arrays of coaxial nanocables, consisting of germanium or magnetite nanowires surrounded by cobalt nanotube sheaths, within anodic aluminium oxide membranes. The nanocable arrays were prepared using a supercritical fluid (SCF) inclusion process, whereby the cobalt nanotubes were first deposited on the pore walls of the nanoporous membranes and subsequently filled with germanium or magnetite to form coaxial nanocables. The composition and structure of the magnetic-semiconductor nanostructures was investigated by electron microscopy, energy dispersive x-ray mapping and x-ray diffraction at high angles. The magnetic properties of the coaxial nanocables were investigated using a superconducting quantum interference device (SQUID). In essence, the SCF methodologies described are useful for merging semiconductor and magnetic technologies into well-defined building blocks which may ultimately lead to new multifunctional devices, such as spin-field effect transistors.