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Single domain ferromagnet/superconductor nanoscale heterostructures ANDREI URSACHE, JAMES GOLDBACH, THOMAS RUSSELL, MARK TUOMINEN, University of Massachusetts Amherst — Nanoscopic single-domain ferromagnetic elements promise simple model behavior for future generations of spintronic devices. In this work, ferromagnetic/superconductor (Co/Pb) multilayer nanowire devices with point contact interfaces are fabricated by electrodeposition in P(S-b-MMA) diblock copolymer derived nanoporous templates, which can produce lateral dimensions as small as 10 nm. Using a single two ion species electrolyte, selective electrodeposition of Co and Pb is achieved by electrode potential control, and the process is characterized in situ by an electrochemical quartz crystal microbalance technique. This fabrication scheme provides the possibility of probing the transport spin polarization of a a single domain ferromagnetic nanowire by means of point contact Andreev reflection (PCAR) spectroscopy. Preliminary electron transport measurements will be presented. This work is supported by NSF grants DMR-0306951, DMI-0103024 and MRSEC.

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