Abstract Submitted
for the MAR07 Meeting of
The American Physical Society

Isolated nanomagnetic clusters formed by diblock copolymer phase separation inside nanopores of aluminum oxide membrane
PRIYANKA DOBRIYAL, THOMAS P. RUSSELL, University of Massachusetts, Amherst, DAVID RIDER, University of Toronto, IAN MANNERS, Department of Chemistry, University of Bristol, Bristol, UK BS8 1TS — Nanoporous alumina membranes are well known for generating 1-D polymeric nanostructures by wetting them with various polymer melts. In this work, cylindrical diblock copolymers of polystyrene-*b*-poly(ferrocenylsilane) (PS-*b*-PFS) was introduced into the nanopores of aluminum oxide template by capillary force, producing nanorods. Upon removal of the template, the resulting nanorods were microtomed and examined by TEM. The pore diameter was varied to obtain hexagonal PFS domains in PS matrix. Iron in PFS domains was oxidized to iron oxide by degrading the backbone of PFS with UV which cross links PS domain and ozone which oxidizes iron into iron oxide (Fe_2O_3). Hence, hexagonal clusters of iron oxide in the matrix of the other block were formed which have potential application in the field of magnetic data storage devices.

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Date submitted: 29 Nov 2006 Electronic form version 1.4