

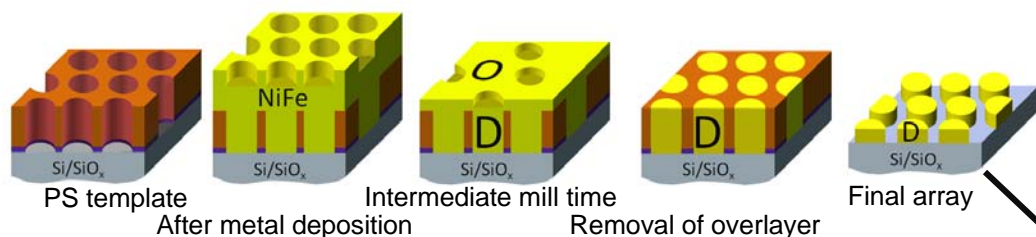
Block Copolymer Patterning of Magnetic Nanostructures

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NNIN Facilities utilized: Nanofabrication Center and Characterization Facility

Process schematic

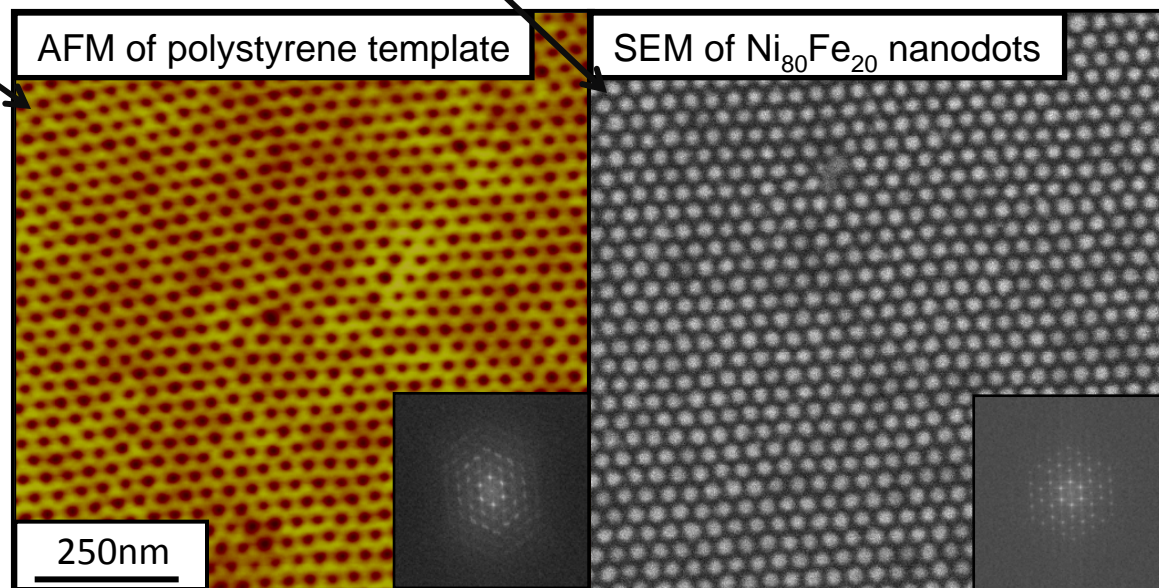


New and optimized approach

- ◆ Solvent annealing of poly(styrene-*b*-lactide) leads to well-ordered cylindrical structures
- ◆ New process scheme leads to high fidelity pattern transfer from self-assembled polymer template to magnetic metal

Process Details

- ◆ Poly(styrene-*b*-lactide) is spun cast onto a Si wafer. Incorporating solvent annealing leads to self assembled, perpendicularly oriented cylinders
- ◆ Aqueous degradation of the polylactide minority block (cylinders) leaves a polystyrene template behind
- ◆ Evaporation of NiFe, in excess, on top of the template fills the dimples (D)
- ◆ Normal incidence Ar ion beam milling planarizes the surface, eventually removing the overlayer (O)
- ◆ The disparity in milling times for polystyrene (10nm/min) and NiFe (2nm/min) leads to a pattern reversal and the formation of NiFe nanodots



A. Baruth *et al.*, "Non-liftoff block copolymer lithography of 25 nm magnetic nanodot arrays", submitted.