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RIE-based Pattern Transfer Using Nanoparticle Arrays as Etch Masks CHIP HOGG, SARA A. MAJETICH, JAMES A. BAIN, Carnegie Mellon University — Nanomasking is used to transfer the pattern of a self-assembled array of nanoparticles into an underlying thin film, for potential use as bit-patterned media. We have used this process to investigate the limits of pattern transfer, as a function of gap size in the pattern. Reactive Ion Etching (RIE) is our chosen process, since the gaseous reaction products and high chemical selectivity are ideal features for etching very small gaps. Interstitial surfactant is removed with an O_2 plasma, allowing the etchants to penetrate between the particles. Their pattern is transferred into an intermediate SiO_2 mask using a CH_4-based RIE. This patterned SiO_2 layer is finally used as a mask for the MeOH-based RIE which patterns the magnetic film. We present cross-sectional TEM characterization of the etch profiles, as well as magnetic characterization of the film before and after patterning.

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