

MINT REVIEW POSTER 2010

Title: Evaluation of Pattern Generation on Metal Surfaces Via Electrodeposition Through Solvent Annealed PS-b-PEO Templates

Authors: Chris Redden^{1,2}, Seth Garrett¹, and Martin G. Bakker^{1,2}

¹*Center for Materials for Information Technology and* ²*Department of Chemistry*
University of Alabama

ABSTRACT

Ordered templates of diblock copolymers have been shown to produce patterned arrays of nanostructures on silicon dioxide substrates. These compounds contain mixtures of both hydrophobic and hydrophilic monomers (blocks) that phase separate under the correct conditions to produce nanostructures. Here nanostructures can be perpendicularly ordered on a substrate by using a benzene solvent vapor to selectively swell one of the components of a polymer film consisting of polystyrene (PS) and polyethylene oxide (PEO) on the native oxide of a Si (100) substrate without the need of thermal annealing. This method has also produced similar ordering of PS-b-PEO on substrates containing tantalum (Ta) and Nickel (Ni). A hard mask can then be produced from the polymer film either through electrodeposition of a metal into the polymer template or selectively etching the polymer away to transfer the pattern to the metal substrate itself through processes such as ion beam etching (IBE) and reactive ion etching (RIE). The use of polymer templates in this manner can lead to fabrication methods for producing ordered arrays of metal structures that can be employed as magnetic recording media in computer hard disk drives (HDD's).