Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Probing 2D Order in Block Copolymer Monolayers Patterned by Graphoepitaxy[1] ADETUNJI ONIKOYI, EDWARD KRAMER, UCSB — We evaluate different experimental strategies for probing the 2D ordering and melting of a topographically constrained spherical morphology diblock copolymer (BCP) monolayer. Diamond and square wells of various dimensions are constructed either on Si or on an electron transparent silicon nitride membrane by electron beam lithography using hydrogen silsesquioxane (HSQ) resist. The walls of the patterned wells are a monolayer thick and are preferentially wetted by the short segment of the BCP. In addition to scanning force microscopy (SFM), transmission electron microscopy (TEM) can be used to determine the domain positions in the wells after thermal annealing. Results show that a near perfect hexagonal 2D lattice can be obtained in small diamond shaped wells of appropriate dimensions. Perfect six-fold symmetry is disfavored in square wells and regions of metastable square packing or defect dense regions of hexagonal packing have been observed as the well dimensions shrink. Further studies are being performed to understand effects of homopolymer addition on the graphoepitaxially patterned BCP films.

[1]UCSB nanofabrication facility, part of the NSF funded NNIN network.

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Date submitted: 24 Nov 2009 Electronic form version 1.4