Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

Interfacial properties of statistical copolymer brushes DAVID TROMBLY, VICTOR PRYAMITSYN, VENKAT GANESAN, University of Texas at Austin — The interfacial properties of statistical copolymers have important ramifications for the design of patterned thin films with preferred morphologies. In order to explore these properties, we study the interfacial properties of random copolymer brushes in contact with a thin film composed of a homopolymer of one of the blocks. We calculate the interfacial widths and interfacial energies between them as a function of different parameters. We find that the interfacial widths decrease (signifying expulsion of the free chains from the brush) with increasing free chain length, grafting density, and Flory interaction parameter χN as well as with decreasing grafted chain length. The interfacial energies show inverse trends to the interfacial widths, except that results for varying grafting density depend on how chemically similar the brush is to the film. We also compare the interfacial efficacies for different types of randomness and find that, except for the case of very blocky chains, blockiness has only little effect on the properties of the interface. We discuss our findings in terms of the design of neutral surfaces and show that our results are consistent with comparable experimental results.

David Trombly
University of Texas at Austin

Date submitted: 17 Nov 2010 Electronic form version 1.4