Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Bottlebrush additives drive formation of vesicle chains in polymer blends HUI ZHEN MAH, PANTEA AFZALI, Univ of Houston, RAFEAL VERDUZCO, Rice University, GILA STEIN, Univ of Houston — The effects of bottlebrush polymer additive with poly (styrene-r-methyl methacrylate) side-chains on the thin film morphology of polystyrene (PS) and poly (methyl methacrylate) (PMMA) blends were studied. Results were compared to PS/PMMA blends with diblock copolymer PS-b-PMMA compatibilizer and without any additive. Thin films were spin casted from toluene onto a "neutral" silicon surface and then annealed at a fixed temperature of 150^{o}C for a range of times (up to 85 mins). The morphology of the films was characterized using optical microscopy and atomic force microscopy. In the absence of any additive, the PS/PMMA blend rapidly de-mixes to form macroscale domains, while high loadings of the PS-b-PMMA additive can compatibilize the blend and suppress phase separation. However, the bottlebrush polymer additive drives the formation of well-organized vesicle chains in the PS/PMMA blend films. This morphology is favored by entropic considerations as the bottlebrush polymers are more stable than linear chains at the PS/PMMA interface and the brush like surface attracts.

Hui Zhen Mah
Univ of Houston

Date submitted: 13 Nov 2014 Electronic form version 1.4