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Fluorine effects on morphology and surface energy of diblock copolymer thin films[1] UMESH SHRESTHA, DVORA PERAHIA, Clemson University, STEPHEN CLARSON, University of Cincinnati — The interfacial composition and structure formed by the segregation between the incompatible blocks in a diblock copolymer thin film influence the stability and response of the film to external stimuli. Introduction of fluorine enhances the interfacial energy as well as chemical and thermal stability of the polymer film. Here we follow the interfacial structure and response of Si containing diblock co-polymer polytrifluoro propyl methyl siloxane-polystyrene (PTEPMS-PS) with the SiF fraction ranging from 0.03 to 0.5 in surface of the films as a function of temperature and solvent, using atomic force microscopy and contact angle measurement. We found that the tendency of the fluorine to migrate towards surface affects the surface energy while Si in backbone enhances the flexibility of the chains. Thin films prepared from selective good solvent for one of the blocks and good solvent for both blocks formed different structures compared to their melts. Correlation between morphology and volume fraction is dominant above the Tg of the polystyrene whereas below Tg limited effect is observed.

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