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Morphology of Fluorinated and Sulfonated diblock Copolymers
TOMONORI HOSODA, SAM GIDO, Polymer Sci. & Eng., Univ. of Massachusetts Amherst, TIANZI HUANG, JIMMY MAYS, Univ. of Tennessee Knoxville — We have studied the micro-phase separation of Fluorinated and Sulfonated diblock Copolymers. The polymer was synthesized by post-polymerization fluorination and sulfonation of PI-b-PS diblocks. THF containing different weight fraction of water was used as solvents for the diblock copolymers to solution casting films. From the dry THF, we obtained a coexistence morphology of well-ordered lamella and cylinders. As the water content in the solvent was increased, the morphology changed from well-ordered to disordered. In addition, it was to be found that thermal annealing at 120C of the well ordered samples caused the morphology become disordered. The progressive disordering of the structure upon annealing was directly observed with TEM and SAXS. The results are very different the usual behavior or uncharged diblock copolymers in which annealing generally results in improvements in long range order. The disordering upon annealing may be the result of ion cluster formation which interferes with the normal block copolymer morphology.

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