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Surface Segregation of Well-Defined Comb Polymers[1]
BOXI LIU, RODERIC QUIRK, MARK FOSTER, The University of Akron, DAVID WU, Colorado School of Mines — Blending polymers with different chain architectures may prove useful in controlling interfacial properties by controlling interfacial segregation. A linear response theory by Wu *et al.* predicts that a long-chain branched polymer blended with its linear analog will be preferentially segregated to the surface and interface of the blend film. The comb architecture is particularly promising for achieving substantial surface segregation. In particular, its high degree of branching provides a substantial driving force for surface segregation when chain ends prefer the surface. Comb polystyrenes with well-defined architectural details were prepared by living anionic polymerization via the "grafting-through" approach. Neutron reflectivity (NR) and secondary ion mass spectrometry (SIMS) analyses reveal that the comb polymers that are still miscible with linear analogs in the bulk segregate so strongly to the surface that the surface concentration is nearly 100 vol%. The effect on the surface segregation of bulk concentration and chain end chemistry will be discussed.

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Boxi Liu
The University of Akron

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