Investigating the solid-state morphology and solution-state chain scission in PIB-PS bottlebrush copolymers

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Due to their self-assembly behavior, bottlebrush copolymers are attracting significant interest in applications including the encapsulation/release of molecules for delivery, biological imaging in aqueous environments, and functional films. Additionally, this self-assembly allows for unique morphologies and lower viscosities to be achieved at higher molecular weights compared to traditional, linear block copolymers. However, synthesizing bottlebrush copolymers with different blocks remains challenging due to the varying solubilities, reactivities, and functionalization of the blocks. In this study, we synthesized bottlebrush copolymers with various architectures using polyisobutylene (PIB) and polystyrene (PS) macromonomers via ring-opening metathesis polymerization (ROMP).

