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Polystyrene-Polylactide Bottlebrush Block Copolymer at the Air/Water Interface LEI ZHAO, MYUNGHWAN BYUN, JAVID RZAYEV, ZHIQUN LIN, FUNCTIONAL POLYMERIC NANOCOMPOSITES TEAM, POLYMER COLLABORATION — Hydrophobic ultrahigh molecular weight bottlebrush block copolymer and linear block copolymer of polystyrene-poly(lactide) (PS-PLA) were shown to be capable of forming Langmuir monolayers and exhibiting unique assembly behaviors at the air/water interface, which cannot be addressed by the classic theory of Langmuir monolayer of amphiphilic copolymers. New models were proposed to illustrate these intriguing surface behaviors. The self-assembled structure of Langmuir monolayer of bottlebrush block copolymer was determined by a combination of AFM measurement, thermal annealing, and enzymatic degradation experiment. To the best of our knowledge, this is among few studies on hydrophobic block copolymers at the air/water interface. As such, it not only complements the well-known models of self-assembly of amphiphilic block copolymers at the air/water interface but also expands the use of Langmuir-Blodgett (LB) technique to hydrophobic block copolymers.

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