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Neutron Reflectivity Studies of Thin Films of Symmetric Block Copolymer and PS-Modified C_{60} KATIE CAMPBELL, RYAN KINCER, DAVID BUCKNALL, YONATHAN THIO, HASKELL BECKHAM, Georgia Institute of Technology — C_{60} has a miscibility limit of approximately 1wt% in polystyrene as indicated by wide angle x-ray scattering and molecular dynamics simulations. In order to use block copolymers as a template for creating ordered arrays of fullerenes, it necessary to increase the concentration of C_{60} while maintaining dispersion. C_{60} grafted with six polystyrene arms ($C_{60}PS_6$) was shown to be miscible with PS up to 80wt% as C_{60} aggregation was not observed. Because $C_{60}PS_6$ offers improved miscibility with PS, we have investigated $C_{60}PS_6$ with a symmetric poly(deuterated styrene-*b*-methyl methacrylate) block copolymer (dPS-PMMA) using neutron reflectivity (NR). NR was used to examine the effects of nanoparticle concentration and size, annealing conditions, and thin film thickness on the location and formation of a $C_{60}PS_6$layer and block copolymer phase behavior. Reflectivity results indicate the formation of dPS-PMMA lamellae oriented parallel to the silicon substrate after thermal annealing for films prepared from 4wt% solution at all concentrations of $C_{60}PS_6$ investigated. Similar results were seen for films prepared at different thicknesses and annealed at constant temperature.

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