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Surface Modification Using Photo-Crosslinkable Random Copolymers JOONWON BAE, UMass, JOONA BANG, UCSB, PETER LOWENHIELM, UCSB, CHRISTIAN SPIESSBERGER, UCSB, THOMAS P. RUSSELL, UMass, CRAIG J. HAWKER, UCSB — We recently reported that poly(styrene-*r*-methyl methacrylate) (PS-*r*-PMMA) random copolymers containing benzocyclobutene (BCB) group can be used to modify the surface effectively by thermal crosslinking. It was demonstrated that this method is simple, rapid, and robust, and can be applied to various surfaces. However, it requires the large amount of heat for processing, and the BCB monomer itself involves a hard chemistry. An alternative way that can replace BCB with easier chemistry and lower cost, if possible, is highly desirable. We introduce the new functional group, azide group, which can be crosslinked simply by UV irradiation, for this purpose. PS-*r*-PMMA random copolymers, containing various amounts of azide groups, were synthesized via controlled living-radical polymerization. It was demonstrated that even after 1 minute of the UV irradiation can crosslink the materials effectively, so that they can be used as crosslinked random copolymer mat to control the surface energy. However, it was observed that the longer irradiation time causes the damages on the surface due to the other side reactions. Depending on the UV intensity, the UV irradiation time, and the amount of azide group, the effective processing window that leads to the crosslinking without any surface damages was optimized.

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