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Knotted ring polystyrene (PS) with high molecular weight ( $M_w=380k$ ) was synthesized by intramolecular cyclization reaction in cyclohexane under diluted condition. Crude cyclization product was confirmed to include linear precursor molecule, single ring molecules, and various intermolecular-reacted byproducts by SEC and interaction chromatography (IC) characterizations. The crude product was fractionated several times by SEC and IC and finally highly purified knotted ring molecules were obtained. Furthermore the same cyclization reaction was also carried out in tetrahydrofuran to obtain unknotted ring and was purified by SEC and IC fractionations as well. SEC connecting with multi-angle laser light scattering and dynamic light scattering was used for the molecular characterization of the samples. It was found that the radii of gyration and hydrodynamic radii of the knotted ring polymers are evidently smaller than those of linear and the unknotted ring polymers, while knotted polymer molecules have the same absolute molecular weight as the corresponding counterparts. The chain dimensions of the both rings obtained were compared with those predicted by computer simulations. (Received December 12, 2011)