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Adsorption and Fractionation of RAFT-polymerized PS-b-PMMA Block Copolymers for 2D Liquid Chromatography JUNWON HAN, CHANG Y. RYU, Rensselaer Polytechnic Institute, HO-CHEOL KIM, GREG BREYTA, HIROSHI ITO, IBM Almaden Research Center — Polymer adsorption in nanoporous silica is important for the advancement of polymer separation and purification techniques. In particular, we will demonstrate how understanding of the polymer nanopore adsorption can be applied for (1) a quantitative analysis of block copolymers using the adsorption-based interaction chromatography and (2) a large scale fractionation of block copolymer using a simple gravity column of silica gel. Our target polymers for the analysis and fraction are polystyrene-block-poly(methyl methacrylate) diblock copolymers (PS-b-PMMA) synthesized by reversible addition-fragmentation chain transfer (RAFT) polymerization. PMMA precursors with phenyldithiobenzoate end group are used as a macromolecular chain transfer agent for the RAFT polymerization, and the contents of PS and PMMA homopolymers in the RAFT PS-b-PMMA block copolymers have been quantitatively analyzed by a solvent gradient interaction chromatography technique. Specifically, we have employed both bare silica and C18-bonded silica columns for the 2-dimensional chromatography analysis and large scale fractionation of the block copolymers in terms of their chemical heterogeneity.

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