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Mass Transport through Dynamic Polymer Networks Containing Reversibly Associating Side-Groups JIAHUI LI, ANDREW HILMER, MITCHELL ANTHAMATTEN, Department of Chemical Engineering, University of Rochester, HUNG CHUNG, JAMES MCGRATH, Department of Biochemical Engineering, University of Rochester — Dynamic polymer networks containing both covalent crosslinks and reversibly associating side-groups were synthesized. Those polymers exhibit novel shape-memory properties due to strong temperature dependence of side-group association. Diffusion of different molecules through polymer networks were studied using three techniques: gravimetric sorption, dye permeation, and fluorescence recovery after photo-bleaching. The dependence of diffusion on temperature, network architecture, solute size, and the interaction between the solute and the network will be discussed. Results show polymer networks with reversibly associating side-groups exhibit unusually strong temperature dependence. This study highlights the potential of these and other dynamic networks to serve as precision drug or reagent release devices.

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