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Development of a Constitutive Model for Shape-Memory Polymers Containing Reversible H-Bonding Associating Groups JIAHUI LI, Department of Chemical Engineering, University of Rochester, JAMES VIVEROS, Department of Chemical Engineering, University of Rohcester, MITCHELL ANTHAMATTEN, Department of Chemical Engineering, University of Rochester — A constitutive model was developed to interpret the shape-memory behavior of elastomers containing reversible H-bonding side-groups. The elastomers studied were copolymerized with butyl acrylate, ureidopyrimidinone (UPy) containing monomer, and crosslinkable monomers. These novel shape-memory elatomers exhibit good shape recovery properties, and more interestingly, their shape recovery rate is tunable due to the dynamics of H-bonding dissociation. Creep experiments at different temperatures were acquired using a thermal-mechanical analysis instrument. By fitting the data using the constitutive model, typical Arrhenius-like temperature dependence was found for the viscosity component of the model. In addition, activation energies were obtained, and correlations between fit activation energies and the activation energy of UPy H-bonding dissociation were discussed.

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