

Supramolecular Polymers as Dynamic Films and Coatings

Stuart J. Rowan

Department of Macromolecular Science and Engineering, Case Western Reserve University,
2100 Adelbert Road, Cleveland, OH 44106-7202, USA

stuart.rowan@case.edu

Over the last decade the area of supramolecular polymerization, i.e. the self-assembly of small monomeric units into polymer-like materials through the use of the non-covalent bond, has received a growing amount of attention. Conceptually, a simple way to achieve such supramolecular polymers is by attachment of appropriate supramolecular motifs to the ends of a core unit. The backbones of the resulting polymeric systems will therefore contain non-covalent bonds, in addition to covalent bonds, which can impart on the system a dynamic capability upon exposure to an appropriate external stimulus. We have developed a range of new mechanically stable supramolecular polymer films and coatings that change their properties in response to stimuli such as temperature, light or specific chemicals. To this end we have developed a range of “smart” materials including, films that can reversibly change their stiffness, chemical warfare agent sensors and rehealable coatings.