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Integration of Covalent and Supramolecular Polymers

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Supramolecular polymers with their energy-tunable noncovalent bonds among structural units have inherent potential as materials that are reversibly responsive, dynamic, adaptable, or capable of integrating synergistic functions. The possibility of programming interactions in these systems also provides a good platform to design hierarchical structures. Covalent polymers, on the other hand, can provide robust mechanical properties but have only limited capacity to sustain long range order and short time scale dynamics. The integration of covalent and supramolecular polymers offers potential to design soft matter with novel functionality by virtue of the combination of order, rapid dynamics, and high mechanical properties. This lecture will provide examples of such hybrid polymers and some of their properties, including systems generated by simultaneous covalent and supramolecular polymerization, and others in which the covalent and supramolecular phases are formed sequentially.