

Abstract Submitted
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Peptide assembly for nanoscale control of materials DARRIN POCHAN, University of Delaware — Self-assembly of molecules is an attractive materials construction strategy due to its simplicity in application. By considering peptidic, charged synthetic molecules in the bottom-up materials self-assembly design process, one can take advantage of inherently biomolecular attributes; intramolecular folding events, secondary structure, and electrostatic interactions; in addition to more traditional self-assembling molecular attributes such as amphiphilicity, to define hierarchical material structure and consequent properties. Design strategies for materials self-assembly based on small (less than 24 amino acids) beta-hairpin peptides will be discussed. Self-assembly of the peptides is predicated on an intramolecular folding event caused by desired solution properties. Importantly, kinetics of self-assembly can be tuned in order to control gelation time. The final gel behaves as a shear thinning, but immediately rehealing, solid that is potentially useful for cell injection therapies. The morphological, and viscoelastic properties of these peptide hydrogels will be discussed. In addition, slight changes in peptide primary sequence can have drastic effects on the self-assembled morphology. Additional sequences will be discussed that do not form hydrogels but rather form nanoscale templates for inorganic material assembly.

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