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Self-Assembling Octa-peptides ALINE MILLER, ANTONIOS KONSTANTOPOLOUS, LAURENT CARON, ALBERTO SAIANI, University of Manchester — In this work we have focused on examining systematically the effect of hydrophobicity, charge distribution and size of amino acid on the self assembly behavior of a series of octa-peptides that have been synthesized in our laboratory: AEAEAKAK, AEAKAEAK, FEFKFEFK. FEFKFEFK, FDFDFRFR, FDFRFDFR, FDFDFKFK, FDFKFDFK, FKFDFDFK and FDFKFKFD. The structure of our systems have been elucidated using a combination of Fourier transform infra-red spectroscopy, atomic force microscopy and small angle neutron scattering. This work has shown that the peptides form beta-sheet rich fibrils that have circa 4-6 nm in diameter, and these can associate further along their length scales depending on the amino acid sequence. In some cases these fibrils, or thicker fibers, then become physically entangled to give rise to a 3-dimensional fibrillar hydrogel that does not flow upon inversion of the sample vial. The mechanical properties of all resulting hydrogels have been explored using oscillatory rheometry and results related back to hydrogel structure across the length scales. Here we will present phases diagrams, propose a generalized gelation mechanism and link molecular structure to macroscopic properties.

Aline Miller
University of Manchester

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