MAR06-2005-000255

Abstract for an Invited Paper
for the MAR06 Meeting of
the American Physical Society

Structural an Dynamical Properties of Some Equilibrium Polymers.

JEAN SAUVEUR CANDAU, Universite Louis Pasteur

The most detailed studies on equilibrium polymers have been performed on surfactant wormlike micellar solutions. Recently the formation of reversible supramolecular polymers through H bond mediated self assembly of two homofitopic heterocomplementary monomers were reported. In apolar solvents, highly viscoelastic solutions were observed at concentrations as low as 2 mM, thus indicating a network-like structure. We have studied a supramolecular polymeric system formed through a sextuple hydrogen bonding of a Janus-type wedge and a corresponding receptor. Small Angle Neutron Scattering experiments showed that the monomers self assemble into long unidimensionnal aggregates whose local structure is independent of temperature and concentration. From the values of the cross section and the mass per unit length of the fibers it can be inferred that these fibers contain several monomolecular wires. The concentration and temperature dependences of the average polymer length were found to be similar to those of worm-like micelles. Non linear rheological experiments showed a shear-banding instability as in micellar systems. However the concentration dependence of the terminal time of the stress relaxation suggests the formation of additional transient crosslinks in the supramolecular polymeric systems resulting in a slowing down of the relaxation as in associating polymers.