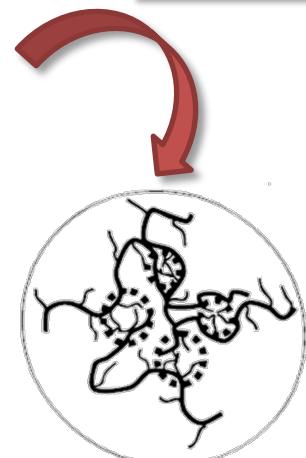
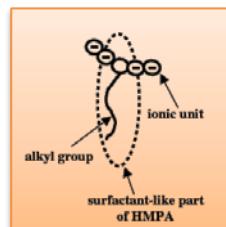
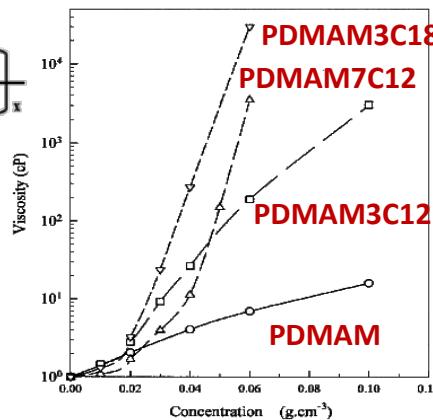
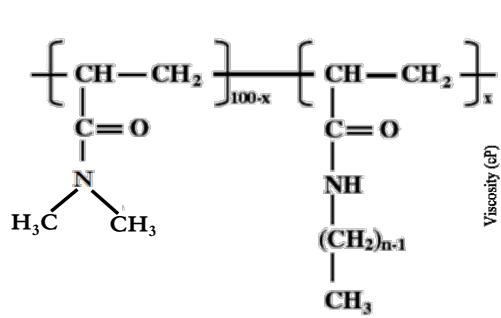


Reology Modifiers/Reversible Hydrogels

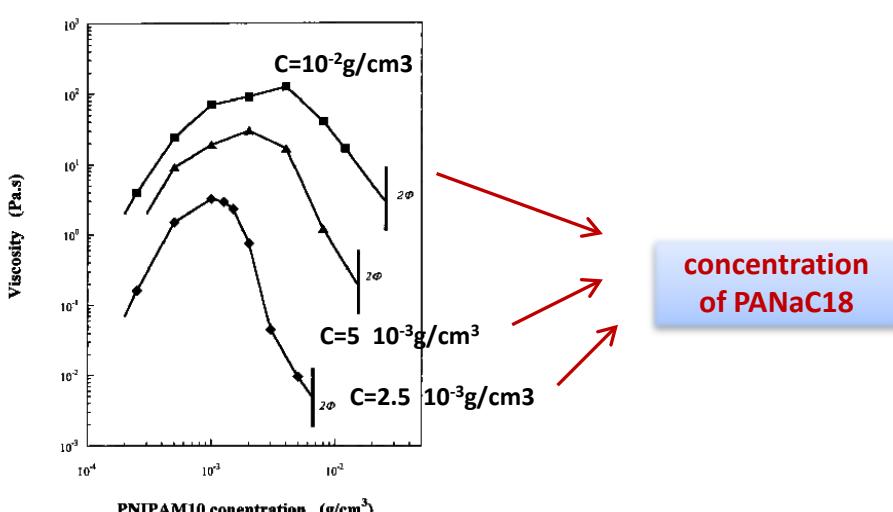
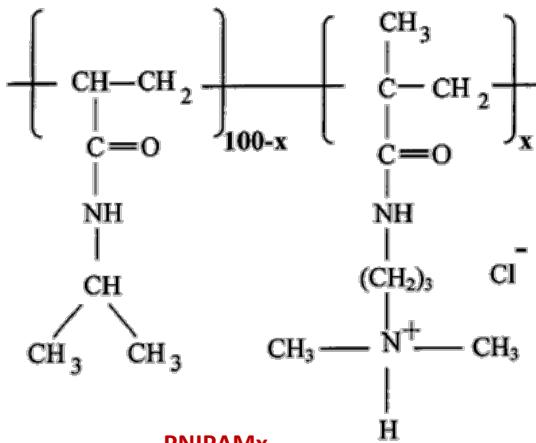
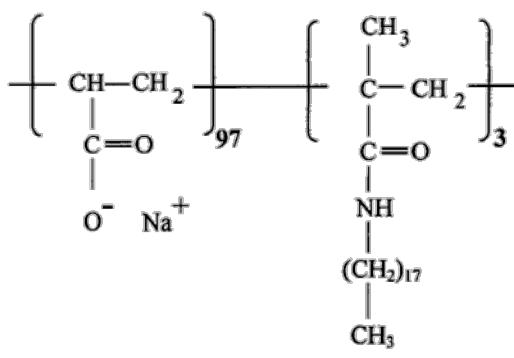
Concentration-Controlled Thickening

❖ Associative Polymers



L. Guillaumont, G. Bokias and I. Iliopoulos, Macromol. Chem. Phys. 2000, 201, 251-260.

❖ Mixtures of oppositely charged associative polymers

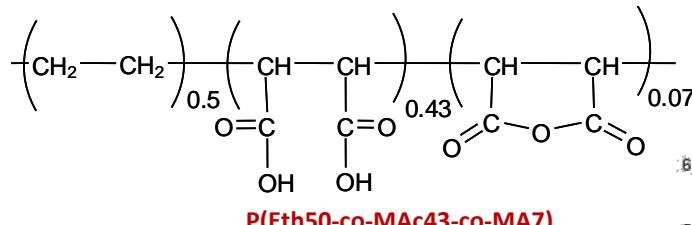


G. Bokias and Y. Mylonas, Macromolecules 2001, 34, 885-889.

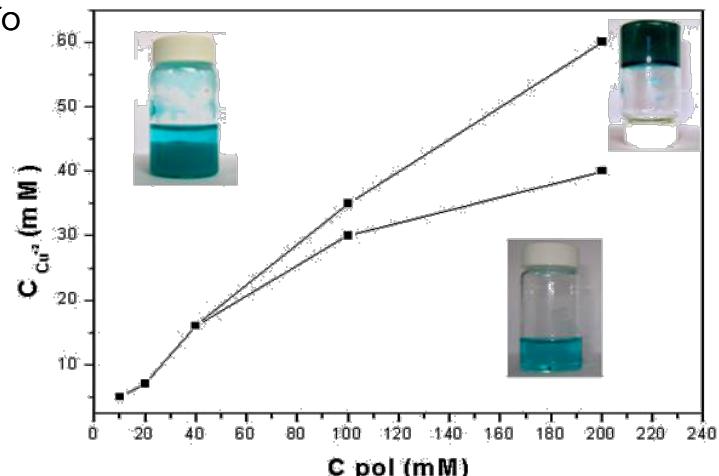
Reology Modifiers/Reversible Hydrogels

Gelation through Complexation with Cu²⁺ Ions

❖ Complexation of P(Eth50-co-MAc43-co-MA7) with Cu²⁺ Ions



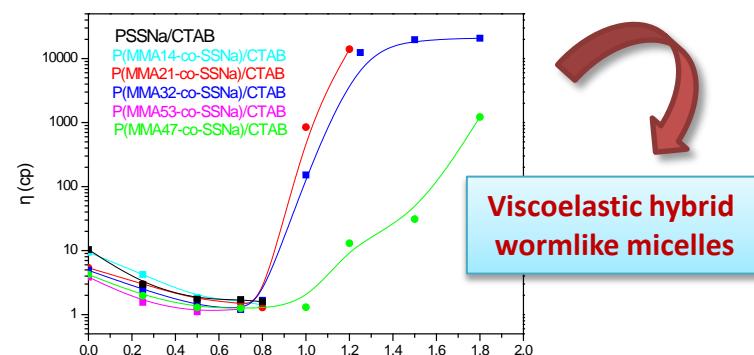
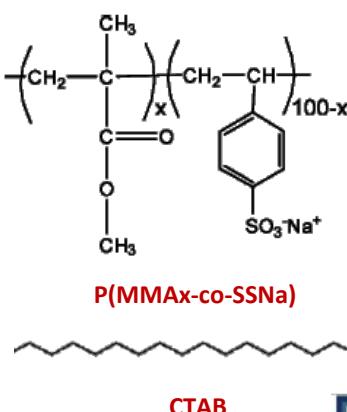
Phase Diagram



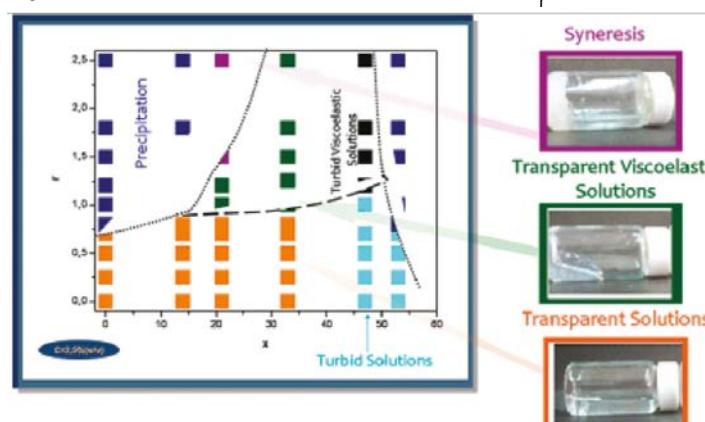
E. K. Oikonomou, N. Lezi, G. Bokias, J. K. Kallitsis and I. Iliopoulos, *Euro. Polym. J.* 2009, 45, 3426–3432.

Gelation through Association with Surfactants

❖ Complexation of SSNa-copolymers with CTAB in dilute aqueous solution



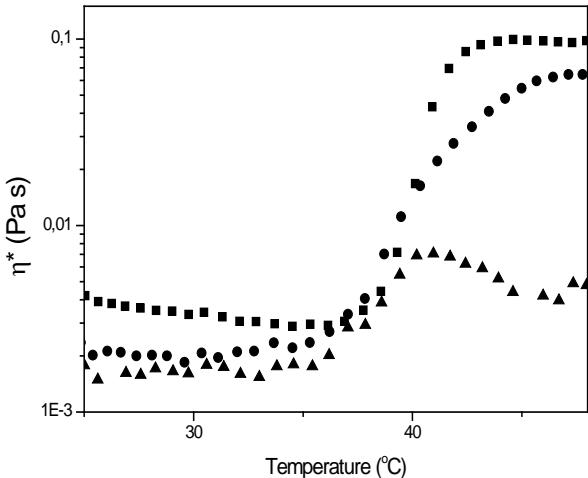
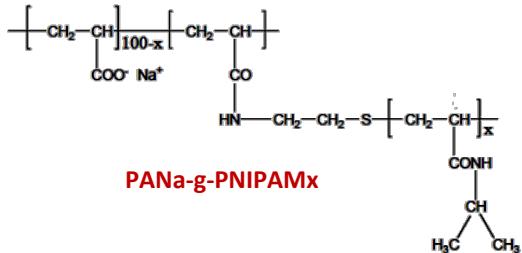
Viscoelastic hybrid wormlike micelles



E. Oikonomou, G. Bokias, J. K. Kallitsis and I. Iliopoulos, *Langmuir* 2011, 27, 5054–5061.

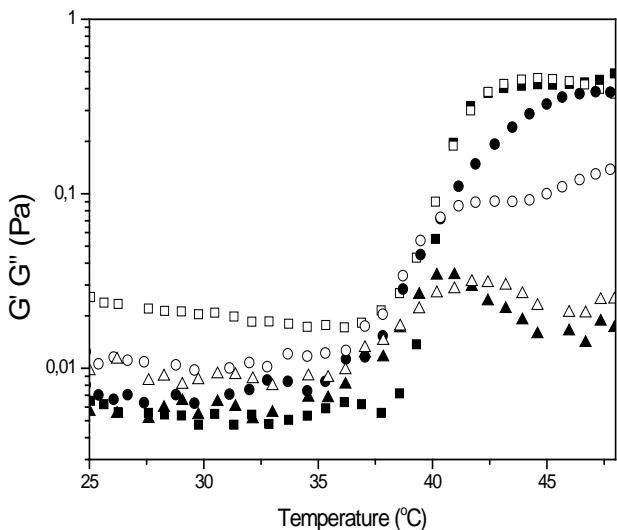
Reology Modifiers/Reversible Hydrogels

Thermoassociating Systems



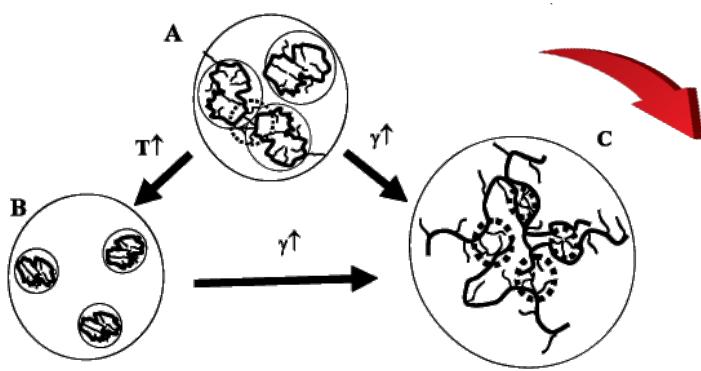
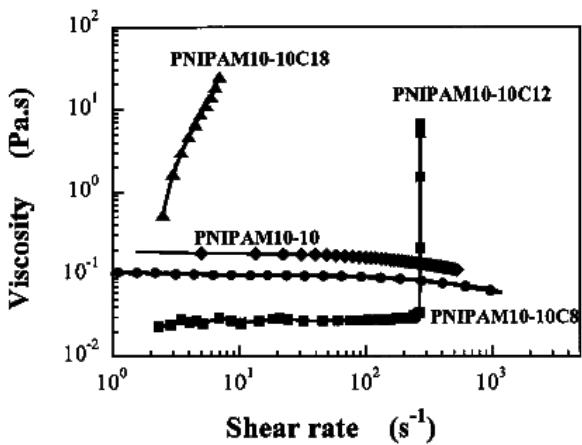
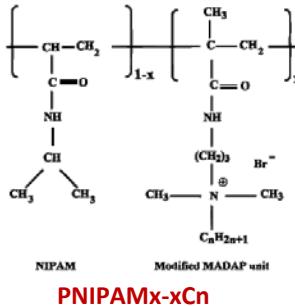
Temperature dependence of the complex viscosity, η^* , of pure aqueous PANA-g-PNIPAM80 solution (■) and aqueous PANA-g-PNIPAM80/Cu²⁺ mixtures containing 1 mM (●) or 2 mM (▲) Cu²⁺ ions. C_{ANA} = 15 mM.

Z. Iatridi and G. Bokias, Langmuir 2009, 25, 7695–7703.



Pure aqueous PAna-g-PNIPAM80 solution (■), aqueous PANa-g-PNIPAM80/Cu²⁺ mixtures containing 1 mM (●) or 2 mM (▲) Cu²⁺ ions. The solid symbols refer to the storage modulus, G', while the open symbols refer to the loss modulus, G''. C_{Ana}=15mM.

Shear-Induced Thickening



A (at rest): polymer chains form mainly intrachain hydrophobic aggregates, with a possibility of some interchain junctions.

C: when shear is applied, these aggregates are deformed. Above γ_{cr} (critical shear rate), additional interchain hydrophobic junctions are formed, and the system behaves as a reversible network.

B: By increasing temperature, the polymer chains shrink and the intrachain hydrophobic aggregates are reinforced. Now, higher shearing is needed to pass to state C.