Self-assembled amphiphilic block copolyelectrolytes investigated by SANS

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When dissolved in a selective solvent for the A block at a sufficiently high concentration, triblock copolymers of BAB type form 3D networks consisting of hydrophobic microdomains of the B blocks connected by A bridges[1]. The rheological properties of these networks depend to a large extent on the lifetime of the bridges i.e. the dynamic exchange of the B blocks between the hydrophobic microdomains[2]. Amphiphilic copolymers are however usually in a frozen state in aqueous medium, so that the exchange of B blocks between the hydrophobic microdomains is immeasurable slow[3] and permanently cross-linked hydrogels are obtained[4, 5].

It was recently shown for BAB triblock copolymers based on a poly(acrylic acid) (PAA) hydrophilic A block and hydrophobic B blocks consisting of randomly distributed *n*-butyl acrylate (*n*BA) and AA units that the incorporation of hydrophilic AA units within the B blocks resulted in dynamic rather than frozen networks[5]. Moreover, the pH-sensitive character of the AA units allowed control of the exchange dynamics over more than 10 decades by changing the pH or the AA content or the self-assembled block copolyelectrolytes. We will report on results from scattering techniques and especially SANS that help at elucidating the 'living' nature of such self-assemblies.

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