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NANOPARTICLES FORMED BY INTERCHAIN HYDROGEN BONDING OF POLY(METHACRYLIC ACID)-*block*-POLY(ETHYLENE OXIDE) COPOLYMERS

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Polymer-polymer complexes are formed by association of various macromolecules. Complex formation and its stability are often sensitive to the environment which makes the complexes good candidates for applications in biotechnology and in biomedicine. Of interest here are the complexes formed via hydrogen bonds between diblock copolymers of model hydrogen donors such as polycarboxylates and hydrogen acceptors such as poly(ethylene oxide). Therefore, the aqueous solution properties of poly(methacrylic acid)-*block*-poly(ethylene oxide) (PMAA-*b*-PEO) copolymers were investigated by static and dynamic light scattering methods.

Well defined pH-sensitive micelle-like nanoparticles formed by interchain hydrogen bonding of PMAA-*b*-PEO copolymers were prepared and investigated at $\text{pH} < 5$. Both the molecular weight M_w and hydrodynamic radius R_h of micelles increase with decreasing pH of solution, displaying an asymptotical tendency at low pH values. The observed nanoparticles (10 – 40 nm) are well defined with narrow size distributions (polydispersity $\Delta R_h/R_h \leq 0.05$, ΔR_h is a half-width) comparable with regular diblock copolymer micelles. The critical nanoparticle concentrations are slightly below $c = 0.1$ mg/mL. The nanoparticles are negatively charged and their time-stability is lower than that of regular copolymer micelles based purely on hydrophobic interactions.

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