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Synthesis of functional core-shell nanoparticles of (*poly*)-Styrene-(*poly*)-Ethylene Oxide (PS-PEO) *di*-Block Copolymer

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Functional core-shell polymeric nanoparticles were prepared by emulsion and dispersion polymerization using neutral poly(styrene)-b-poly (ethylene oxide) or [(PS)2180-(PEO)1386] diblock copolymers. These functional core-shell nanoparticles have been prepared using amphiphilic diblock copolymers. The study focuses on variation of different parameters essential for emulsion polymerization. The different parameters are the variation in concentration for (*poly*)-styrene-(*poly*)-ethylene oxide (PS-PEO) and PS-PSS block copolymer solutions considering their critical micelle concentrations (CMC), the styrene/KPS ratio and the stirring speed of the emulsion polymerization system at an appropriate fixed temperature. Copolymers self-assemble into micelles made-up of hydrophobic core and hydrophilic tails attached to the core. The micellar space can be utilized for the transportation of hydrophobic drug molecules with low solubility in blood. Crystallization has been observed for the monodisperse colloidal particles at very low volume fractions. The change in hydrodynamic radius has been studied on addition of salt and at different temperatures for both ascending and descending orders of temperature. CMC has been determined by static light scattering and dynamic light scattering has been used for determination of the micelle size. Transmission electron microscope (TEM) has been used for obtaining diameter for nanoparticles in the dry-state.

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