

Block Copolymer Self-assembly: Core-shell nanoaggregates for drug solubilization and delivery

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Abstract

Block copolymers are generally composed of at least two incompatible polymer segments and self-assemble in selective solvent (good for one block but poor solvent for the other) to form micelle. Amphiphilic block copolymers form micelles in water. Double hydrophilic block copolymers (DHBCs) are important functional polymers that may respond to external chemical or physical stimuli and self-assemble in water. Recent interest has been in stimuli responsive block copolymers for application areas like in drug delivery and fabrication of mesoporous/ nanostructured materials.

In this talk a brief overview of block copolymers with special reference to their microdomain formation in solid state and aggregation in selective solvents will be presented. Self-assembly of (1) ethylene oxide-propylene oxide amphiphilic block copolymers (2) DHBC with neutral or polyelectrolyte blocks and (3) ABC triblock copolymers under the influence of pH, temperature or in the presence of additives will be discussed. The solubilization of some model hydrophobic drugs in core-shell nanoaggregates will be highlighted.

Brief biodata

Prof Pratap Bahadur PhD DSc is currently Head, Chemistry Department at the Veer Narmad South Gujarat University Surat India where he joined as Associate Professor on 16th June 1980 and promoted to full Professor in 1988. He has been visiting scientist in Prague (erstwhile Czechoslovakia for one year in 1978-79), Mulhouse (France for 1 year in 1983-84), Sweden (4 successive trips of 2 months each in 1988,'89,'90 and '91), USA, Ukrain & Russia (2 months, '89), Germany(2 months 2008), China (2 months 2006) and visiting professor in Saga University Japan (2 months 2005), and James Chair Professor at St Francis Xaviers University Antigonish Canada (3 successive visits of 1-2 months each 2009, 2010 and 2011). He attended international conferences and gave invited/plenary talks in several countries. He has supervised 40 PhD students and published 200 research papers. His current research interests include self-assembly from surfactant and block copolymer solutions.

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