

Polymeric Colloidal Complexes

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Double hydrophilic block copolymers consisting of one nonionic and one ionic block have been used to form polyelectrolyte complexes by electrostatic interaction. The complex formation can take place either between two double hydrophilic polymers or between a double hydrophilic polymer and a low molecular weight ionic compound where both components consisting of ionic moieties with charges of different signs. The complexes resemble amphiphilic polymers forming superstructures comparable to polymeric micelles or symplexes if the polyelectrolyte character of the starting material is considered. The aggregates are of colloidal dimensions (some ten nanometers up to micrometers) and they are sterically stabilized by the unchanged remained nonionic water soluble blocks. A wide variety of double hydrophilic polymers consisting of different building blocks can easily be prepared utilizing special radical polymerization techniques. In a first part the preparation of the double hydrophilic polymers and the complex formation is briefly reported. The main part places special emphasis on the characterization of the colloidal complexes regarding composition, size, and morphology.

If double hydrophilic block copolymers consisting of both polyelectrolyte blocks with different charge signs and different nonionic water soluble polymeric blocks are used for the complex formation, the resulting colloidal complexes are sterically stabilized by two different kinds of polymers. These complexes resemble so-called Janus micelles although at the moment a clear experimental proof for a domain formation of the stabilizing blocks at the interface cannot be given. Nevertheless, these complexes may serve as models for cells of living organisms where patches of different compositions at the interface are responsible for the performance of the different functions of a cell.