Characterization of Hydrophilic Polymer Fine Particles by Steady-State Fluorescence Spectroscopy

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(Received November 30, 2005; accepted June 5, 2006)

Key words: hydrophilic polymer, nanoparticles, fluorescence

We synthesized hydrophilic polymer particles based on acrylamide, and their chemical properties are investigated by fluorescence spectroscopy. The morphology of the synthesized polymers was monitored by scanning electron microscopy (SEM) and a dynamic light-scattering analyzer, and it was observed that the synthesized polymers are spherical with a median diameter of ~ 500 nm. A fluorescent probe molecule (C153) was introduced into the polymer/water solution, and the steady-state fluorescence spectrum was observed. In the C153/polymer/water solution, strong fluorescence intensity from the C153 molecules was observed with a maximum intensity at ~ 515 nm, whereas the C153/water solution only gave very weak fluorescence with a maximum at ~ 540 nm. Since C153 is hardly soluble in water, it was concluded that the C153 molecules existed selectively around the particle surfaces. Because of the difference between the fluorescence spectra, it was found that the chemical properties around the polymer surface were very different from that of the bulk water.

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