Using plasma etching to access the polymer density distribution and diffusivity of gel particles

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Abstract

In this paper we examine the polymer density distribution of gel particles and its effect on solvent diffusivity through the polymer network. In order to access the inner particle regions, external polymer layers were removed by plasma etching, thus reducing them from the outside. Higher polymer densities after erosion showed internal heterogeneity, with the density increasing towards the center of the particles. An exponential decay polymer density model is proposed, and the spatial relaxation length measured. The diffusion of solvent through the particles, before and after the plasma oxidation, revealed a correlation between the diffusion coefficient and the internal density.

Author keywords

Diffusion; Minigel; Plasma etching; pNIPAM; Polymer density