

Surface Crosslinked Superabsorbent Polymer To Enhance Mechanical Properties Under external force

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In order for super absorbent polymer (SAP) to be used in an application undergoing mechanical stress, Here, spherical SAPs were prepared through inverse-suspension polymerization of partially neutralized acrylic acid monomers with ethylene glycol diacrylate (EGDA) crosslinkers. The surface region of SAP spheres was additionally crosslinked with ethylene glycol diglycidyl ether (EGDE) to improve the mechanical properties, producing a core-shell structure characterized by lightly crosslinked core and more densely crosslinked shell. The structure of SAP spheres with and without surface crosslinking was also visualized, and thickness of crosslinked surface was measured with fluorescence microscopy. Finally, we propose an analytical diffusion model that describes the diffusion and surface crosslinking reaction to elucidate the mechanism over which the mechanical and diffusion properties of SAP sphere are determined.