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
Synthesis and Swelling Behavior of Starch-Poly (Sodium Acrylate-co-Acrylamide) Superabsorbent Hydrogel

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Abstract: Superabsorbent polymers based on starch (St) and polyacrylonitrile (PAN) were prepared by alkaline hydrolysis of the physical mixture of St and PAN in aqueous solution. The nitrile groups of PAN were completely converted to a mixture of hydrophilic carboxamide and carboxylate groups during alkaline hydrolysis, followed by in situ cross-linking of the PAN chains by the alkoxide ions of St. A proposed mechanism for hydrogel formation was suggested and the structure of the product was established using FTIR spectroscopy. Moreover, morphology of the samples was examined by scanning electron microscopy. The factors that influenced the swelling capacity of the hydrogels were systematically optimized to achieve a hydrogel with swelling capacity as high as possible. Furthermore, the salt sensitivity of the hydrogels was investigated in different saline solutions. The pH-reversibility and on-off switching properties of the hydrogels make the intelligent polymers good candidates for consideration as potential carriers of bioactive agents. Finally, the swelling and de-swelling kinetics behaviors of the hydrogels were preliminarily investigated as well.

Key Words: Starch, polyacrylonitrile, hydrogel, superabsorbent, swelling behavior

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