

Preparation of Comb-type Grafted N-isopropylacrylamide Hydrogel Beads and their Application for Size-selective Separation Media

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Summary

A series of the comb-type grafted poly(N-isopropylacrylamide) (NIPA) gel beads were prepared by inverse suspension polymerization techniques. The comb-type grafted NIPA gel beads exhibited volume phase transition at 34°C, and their deswelling rate, defined as the time required for half- shrinking was ten times faster than that of the normal-type NIPA gel beads. The gel beads were utilized to concentrate dilute aqueous solutions of albumin, γ -globulin and vitamin B₁₂. The separation efficiency of albumin and γ -globulin with the comb-type grafted NIPA gel, respectively, were 80% and 85%. Whereas those with normal-type NIPA gel, respectively, were 55% and 60%. The incorporation of grafted chains into gel makes the effective mesh size (the apparent correlation length) smaller. Therefore it induces additional friction between the solutes and network, and excludes the high molecular weight solutes. After they have extracted water, their rapid deswelling property makes the gel regenerate effectively by warming to release the absorbed water.