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Interpolymer association between hydrophobically modified poly(sodium acrylate) and poly(*N*-isopropylacrylamide) in water: The role of hydrophobic interactions and polymer structure

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Abstract

The association between hydrophobically modified poly(sodium acrylate) (HMPA) and poly(*N*-isopropylacrylamide) (PNIPAM) in aqueous solution was studied using turbidimetry, viscometry and fluorescence measurements. Both the polymeric and the amphiphilic nature of the HMPA influence the association process. The tendency for association, as reflected by the increase in the cloud point and the reduced viscosity of PNIPAM, increases with the length of the alkyl group and the degree of substitution of HMPA. The fluorescence study, using pyrene as a probe, ascertains that the association is of hydrophobic nature and the association process is gradual and less cooperative than the association of PNIPAM with ionic surfactants. When high molar mass HMPA is used, the hydrophobic association between HMPA and PNIPAM leads to the formation of a reversible network with significantly enhanced thickening properties as compared to the thickening ability of the corresponding pure HMPA in aqueous solution.

Keywords: Hydrophobically modified poly(sodium acrylate); PNIPAM; Hydrophobic association; Thickening properties