

Microwave Hydration Measurements in Aqueous Systems of Proteins and Synthetic Polymers

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Microwave treatment at 30 GHz of polymeric aqueous systems was combined with simultaneous hydration measurement by waveguide resonance method. Hydration numbers were estimated from the difference in absorption between undisturbed water and water with solute, as it was attributed to the solute-induced reduction in water mobility. Bound water was shown to be a measure of hydrophobicity allowing to characterize hydrophobically driven processes like temperature-induced coil-globule transition of poly(*N*-isopropylacrylamide) (PNIPA) and gelation of casein micelles at acidification [1, 2].

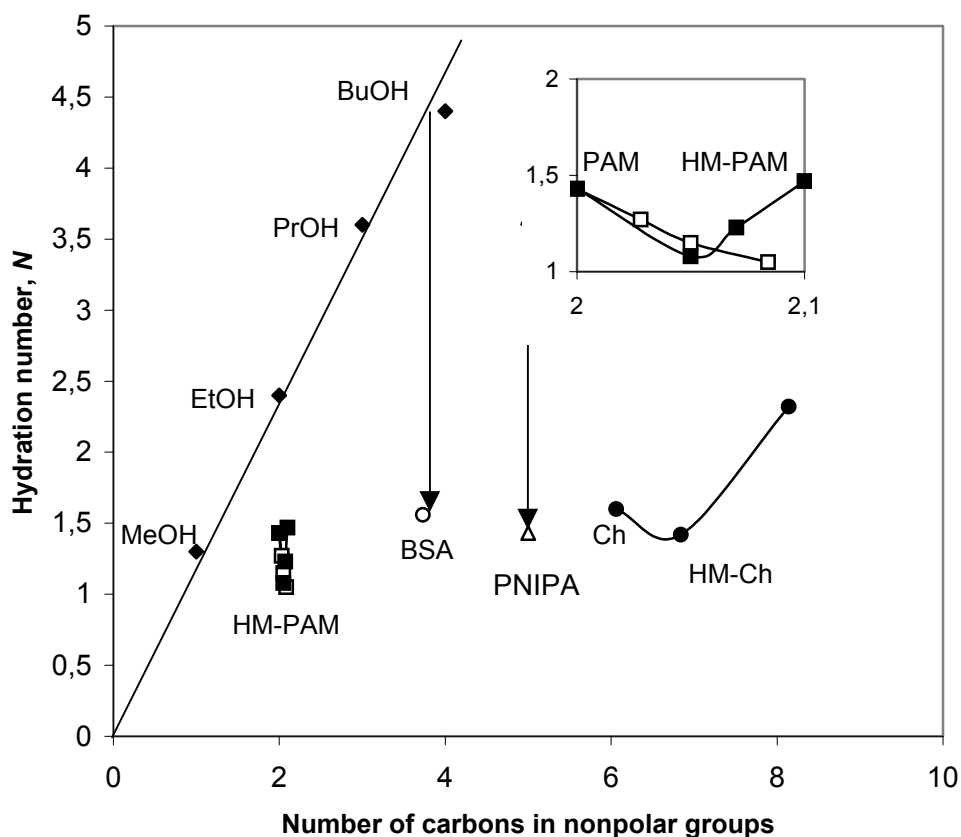


Fig. 1: Dependence of hydration number N on the mean number of carbon atoms in nonpolar groups of hydrophobically modified polyacrylamide (PAM) and chitosan (Ch). PAM and HM-PAM: AM/NMA - ■, AM/DDMA - □; BSA - ○; Ch and HM-Ch - ●; PNIPA(coil) - ▲; PNIPA(globule) - Δ. Straight line corresponds to the aliphatic alcohols (◆).

[1] M.M. Vorob'ev, *Food Hydrocolloids* 21(2007) 309-312.

[2] M. Vorob'ev, N. Churochkina, A. Khokhlov, E. Stepnova, *Macromolecular Bioscience* 7 (2007) 475-481.