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Pressure, Temperature and Concentration Effects on Hydrogen Bonding in Poly(ethylene oxide) Aqueous Solution

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Abstract:

Poly(ethylene oxide) (PEO) is a biocompatible polymer and is widely used in biomedical application such as drug delivery devices. Such biomedical application is suitable due to high water solubility. However, the mixture of PEO and water is highly anomalous because of strong electrostatic attraction like hydrogen bonding interaction. The hydrogen bonding in PEO/water is an important fact to understand the miscibility (i.e., phase behavior) of PEO in aqueous solution and is influenced by temperature, concentration and pressure. The pressure in these factors has a strong effect on the production of the drug delivery material using supercritical fluid technology. In this work, the degree of hydrogen bonding for each molecule in aqueous PEO solution according to temperature, pressure and concentration has been investigated by perturbed-hard-sphere-chain-association (PHSC-AS) models. According to the increase of water concentration, the degree of

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