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Study the cooperative motion of long-chain polyelectrolyte in presence of small globular
protein

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Abstract

We study in this paper the effect of small globular protein on the dynamic properties of long-chain NaPSS in semidilute regime using Dynamic Light Scattering and viscometry in three phases respecting the pH of the medium. The scaling concept of the heterogeneous system is compared with the De Gennes argument for homogeneous polymer solutions. The results showed a positive and negative deviations to the De Gennes approach of the correlation length scale of mixture defined by $(\frac{c}{c^*})^\delta$. The macroscopic viscosity of protein and the potential electrostatic interaction are taken as principal factors affecting the cooperative motion of blobs. δ was discussed as the parameter responsible for the conformational change of polyelectrolyte chain subunit within blob. The theoretical analysis of the electrostatic interaction between protein and subunit gave one possible solution relating the deviation δ to the dimensionless coupling constant u as $\delta \sim \frac{u}{u+1}$ and $\delta \sim -\frac{1}{3} \frac{u}{u+1}$ for a swollen and shrunk

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