Single polymer chain with internal friction

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In recent times single molecule experiments have shown the importance of internal friction in biopolymer dynamics. Such studies also suggested that the internal friction although independent of solvent viscosity has a strong dependence on denaturant concentration. In addition, recent simulations showed that the weak interactions contribute to the internal friction in proteins. In this work we made an attempt to investigate how a single polymer chain with internal friction undergoes reconfiguration and looping dynamics in a confining potential that accounts for the presence of the denaturant, by using recently proposed ‘‘Compacted Rouse with internal friction’’. We also incorporated the effect of hydrodynamics by extending this further to ‘‘Compacted Zimm with internal friction’’. All the calculations are carried out within the Wilemski Fixman framework without invoking excluded-volume effect. By changing the strength of the confinement we mimicked chains with different degrees of compactness at different denaturant concentrations. We extend our model to incorporate the solvent effect as well. While compared with experiments our results are found to be in good agreement.

References

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