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# Diffusion and thermodiffusion of polymers in mixed solvents

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We present experiments on diffusion and thermodiffusion of polymers in mixed solvents. So far, most works on thermodiffusion have dealt with binary systems or ternary mixtures of small molecules. Binary samples with polymers in solvents have been studied over both a broad concentration and polymer molar mass range [1]. Only a few very recent experiments measured polymers in a binary solvent [2,3]. In this work, samples made of polystyrene, toluene and cyclohexane have been analysed using multiple-color optical beam deflection (OBD) and supporting single-color thermal diffusion forced Rayleigh scattering (TDFRS). While binary mixtures are readily characterized by one diffusion and one thermodiffusion coefficient, the number of coefficients increases to four plus two for ternaries. The measured signals show three well separated modes that can be assigned to the thermal diffusivity and the two eigenvalues of the mass diffusion matrix. A first analysis supports the picture of an effective solvent whose internal dynamics is decoupled from the one of the polymer.

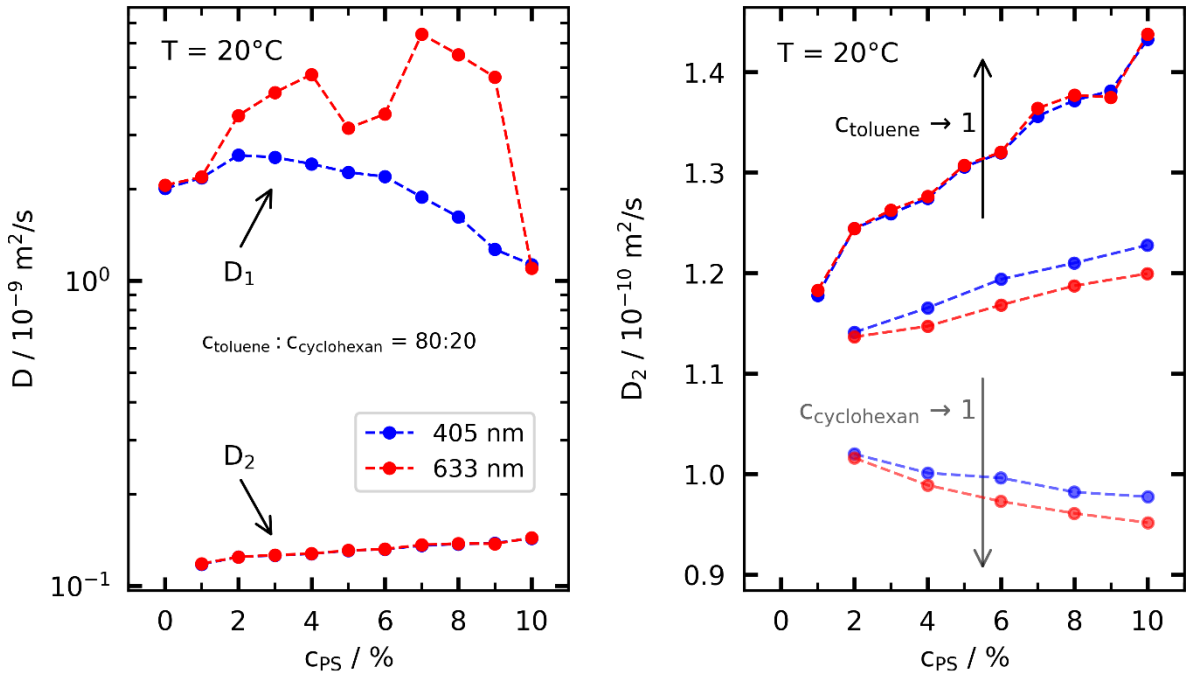


Figure 1: Diffusion coefficients of ternary mixtures with Polystyrene (mass: 18000Da), toluene and cyclohexane. Left: samples containing a constant solvent-solvent-ratio. Right: the smaller Eigenvalue depends not only on the polymer concentration but also strongly on the solvent-solvent-ratio.

## References

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