

Thermal diffusion: an unsolved puzzle in Soft Matter Physics

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It turns out that a simple non-equilibrium environment created by a temperature gradient can be used to monitor the reaction kinetics of large proteins with small substrate molecules. This is probably caused by a change in the hydration layer of the protein which is influenced by subtle conformations changes induced by the binding of the substrate molecule. To get a better understanding of phenomenon we investigated systematically various small molecules, microemulsions and colloids by a holographic grating method called infrared thermal diffusion forced Rayleigh scattering (IR-TDFRS). Looking at the various systems we can identify certain rules of thumb which will be discussed. Open questions such as the radial dependence of the thermal diffusion coefficient and its relation with the interfacial tension and charge effects are considered.

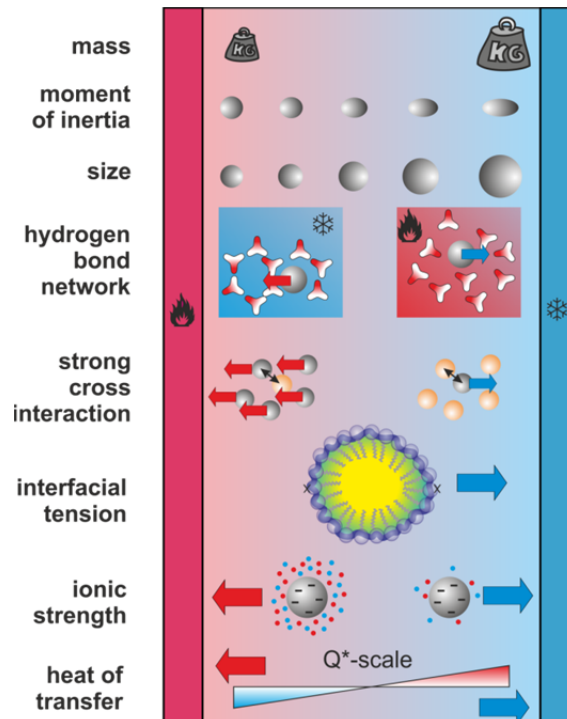


Figure 1 "Rules of thumb" influencing the thermophoretic motion of solute molecules