LIGHT-DRIVEN MOTION OF NON-POROUS SiO_2 PARTICLES IN THE VICINITY OF MICROGELS

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Light triggered size response of microgels in the presence of a photo-sensitive surfactant generates a local fluid flow in the vicinity of microgels causing tracer particles (non-porous SiO_2) to drift away radially, on illumination with light. The extent and duration of this repulsion is manipulated by varying the wavelength of light. This motion stems from diffuso-osmotic flows created by the constant influx and expulsion of the photo-sensitive azobenzene containing surfactant molecules through the matrix of the microgel enabling it to act like a surfactant pump, which on appropriate illumination is capable of generating a stable, steady and continuous flow.

Among various colloidal particles are the microgels which are dynamic in nature as they can undergo changes in size, shape and softness when exposed to varying stimuli. Some of them being temperature, pH, ionic strength, light, magnetic field, etc. To this multi-responsive microgel we employ one stimulus, i.e. light (of appropriate wavelengths) to achieve the required size response and focus our study on understanding the generation and reason behind the local diffuso-osmotic flows in the purlieus of the microgel.