Abstract Submitted for the MAR10 Meeting of The American Physical Society

Photo-manipulation of a liquid droplet by chromocapillary effect ARNAUD SAINT-JALMES, Institut de Physique de Rennes - CNRS, ANTOINE DIGUET, Departement de Chimie, ENS-Paris, REINE-MARIE GUILLERMIC, Institut de Physique de Rennes, NOBUYUKI MAGOME, KENISHI YOSHIKAWA, Kyoto University, YONG CHEN, DAMIEN BAIGL, Departement de Chimie, ENS-Paris — Using simply light at different wavelengths, we show how an oil droplet floating on an aqueous solution can be trapped and rapidly moved along any desired shapes. The technique is based on the presence of a surfactant (adsorbed at the oil-water interface) which configuration and polarity change with the light wavelength. A partial illumination of the droplet, with either visible or UV light, is first used to create wavelength-dependent interfacial tension gradients, meaning that the gradient direction depends on the wavelength of the illumination. Such chromocapil*lary* gradients are then able to induce interfacial flows, finally resulting in reversible droplet motions in directions depending on the light wavelength. By combining ultraviolet and visible light, we then made a chromocapillary trap to capture a droplet on the liquid surface. The trapped droplet can be dragged across the surface at 300 microns per second by moving the trap around. We discuss the potential use of chromocapillary effects in microfluidic devices and in light-responsive materials.

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Date submitted: 29 Dec 2009

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