Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Light-controlled air-water interfaces and thin liquid films using photo-surfactants ELOISE CHEVALLIER, ESPCI, CHRISTOPHE TRIBET, ENS Paris, FRANCOIS LEQUEUX, CECILE MONTEUX, ESPCI — We study the interfacial behavior of photosurfactants containing an azobenzene moiety in the apolar tail –which switch from cis to trans conformation depending on the wavelength of light. We present here results on the effet of stimulation on the interfacial dynamics of such photosurfactants upon illumination. First, without light stimulus, the trans isomers is found to desorb more slowly than the cis, this leads to a fast enrichment of the interface with trans. Under light, adsorbed trans convert to their cis form which quickly desorb resulting in an important decrease of the surface excess and an increase of the surface tension. Besides, we stimulate thin-liquid films stabilized by such surfactants. Several types of hydrodynamical instabilities in the thin-liquid films are generated. We show that these instabilities are due to a strong rise of concentration in-situ but also a light-induced variation of DLVO interactions that usually stabilize the films.

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Date submitted: 16 Nov 2011 Electronic form version 1.4