Supplementary Material (ESI) for Soft Matter

Photo-labile Lamellar Phases-Electronic Supplementary Information

Aihua Zou, Julian Eastoe*, Youssef Espidel, Otto Glatter[#] and Isabelle Grillo[+]

School of Chemistry, University of Bristol, Bristol BS8 1TS, U. K,

julian.eastoe@bris.ac.uk.

[#]*Institut für Chemie, Karl-Franzens Universität Graz, 8010 Graz, Austria and*

[+]*Institut Max-Von-Laue-Paul-Langevin, BP 156-X, F-38042 Grenoble, Cedex, France*[Θ]

Materials and methods

^{2}H-NMR measurements

Table S1. ^{2}H-NMR spectrum experimental conditions

Relaxation delay (s)=	**3.0**
90° pulse length(μs) =	**12.0**
180° pulse length(μs) =	**24**
Number of scans =	**2000**

1. Phase behavior of AOT

A highly studied ionic surfactant producing lamellar phases is Aerosol-OT (AOT). The phase diagram of the system AOT/water binary is well established [1] (Figure S1), exhibiting a wide L_α phase region, a narrow bi-continuous cubic region at ~ 80% AOT, and an inverse hexagonal phase at higher concentrations. At high temperatures, above the lamellar phases is formed an isotropic liquid, which is a micellar solution.

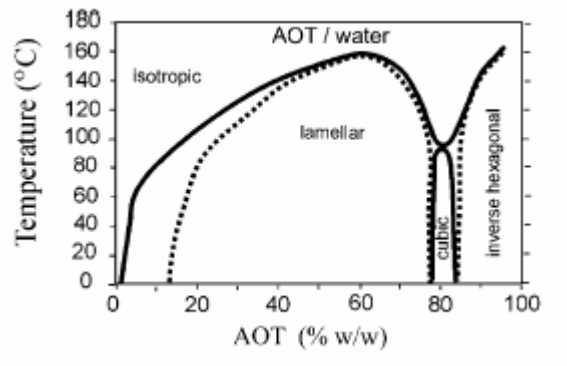

Figure S1. The phase diagram of the AOT-water binary system, from ref. 1. The main ordered phase is the lamellar L_α state, with pockets of bi-continuous cubic and inverse hexagonal phases at high concentrations.

2. C_6PAS photochemistry

Subject to UV irradiation alkyl-phenylazosulfonates switch from a hydrophilic (surfactant-based) to a hydrophobic system (photoproducts). As shown in Figure S2, photoirradiation of sodium 4-hexylphenylazosulfonate (C_6PAS) leads to the formation of two photolysis products 4-hexylphenol and hexylbenzene [2-11]

Figure S3 shows ^{1}H NMR spectra for lamellar phases of 70 wt% (AOT/C_6PAS)-water as a function of irradiation. It is clear that peaks from C_6PAS (δ = 7.86 and 7.26, Figure S3 upper) are absent after the photoreaction. After UV treatment a new weak multiplet at δ= 7.1 appears in the spectrum obtained (Figure S3 lower), which is consistent with a photostationary state dominated by the alkylbenzene.

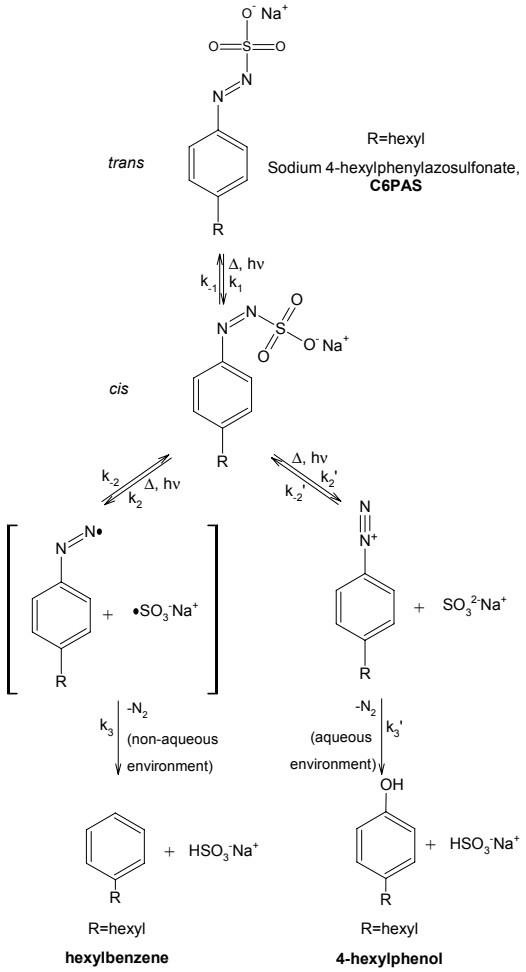

Figure S2. Mechanism of photolysis of phenylazosulfonates, Taken from reference [9].

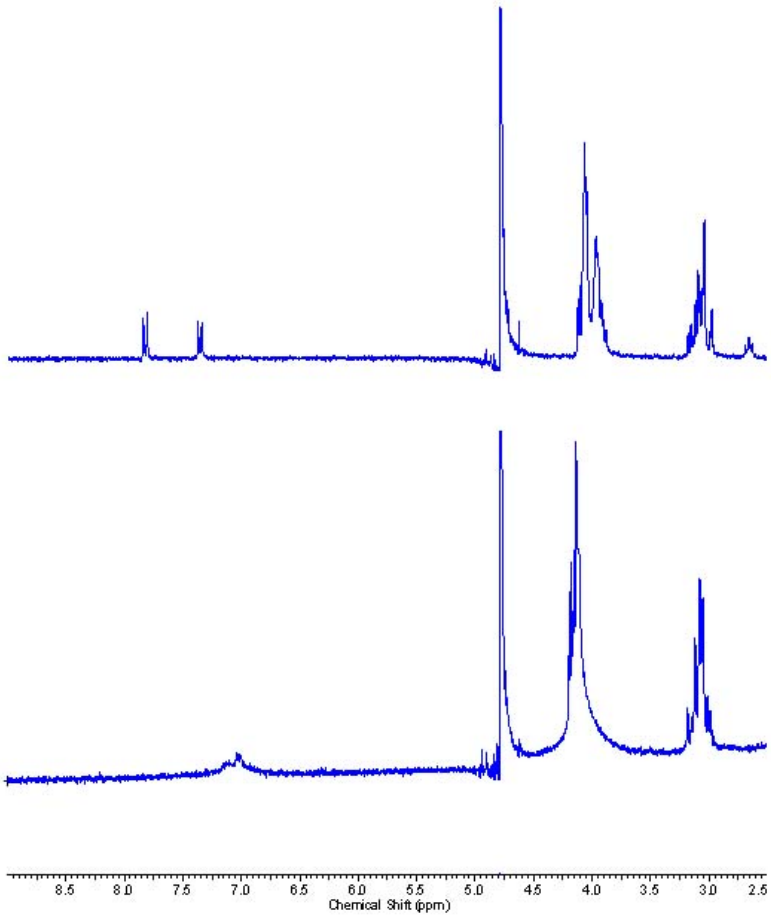

Figure S3. Partial ^{1}H NMR spectra of lamellar phases at 25 °C: 70 wt% (AOT/C_6PAS)-water mixtures before (top) and after (bottom) irradiation.

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