| ESRF | Experiment title: SAXS IN ROD/SPHERE DISPERSIONS UNDER SHEAR | Experiment number: SC-458 |
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Names and affiliations of applicants (* indicates experimentalists):

Borsali, Redouane (*) CERMAV-CNRS BP 53 Grenoble Cedex 9
Diat, Olivier (*) ESRF
Ebeling, Thomas (*) CERMAV-CNRS BP 53 Grenoble Cedex 9
Villetti, Marcos (*) CERMAV-CNRS BP 53 Grenoble Cedex 9
Paillet, Michel (*) CERMAV-CNRS BP 53 Grenoble Cedex 9

Report:

The aim of our experiments was to study rods/spheres suspensions in water using saxs under shear. We had investigated the effects of shear

1)on the orientation of the rods at very low shear
1)on the orientation of the rods in the presence of spheres (depletion ?)
2)close to the phase separation of spheres in the presence of rods

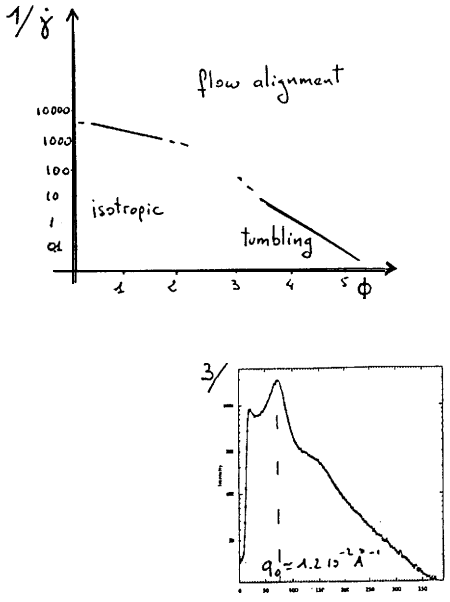
The rods are micro-crystal of Cellulose prepared in our laboratory and the spheres PS latex purchased from Bangs Lab (USA).

The experiments were carried out at different volume fractions for rods (from isotropic to cholesteric phase) and spheres and their mixtures in the couette cell gap of0.5mm that allowed us to cover a shear rate ranging from 0.01 to 3000 l/s. The distance sample/detector was 6m which covering the needed range of scattering vector of interest.

Due to detector problems we have investigated a limited range of concentrations of rods. spheres and their mixtures. Nevertheless, these preliminary results show very important and interesting results, seen probably for the first time on these systems: namely

A reversible tumbling-alignment effect from relatively concentrated solutions above 4% in volume fraction of whiskers up to cholesteric phases (8%) (see figs l-3).

Due to the lack of time we did not analyze all the data (our experiments ended August 29) but this reversible tumbling/alignement effect seems to strongly depend on the concentration of rods and the relative composition of the spheres present in the system, and of course on the applied shear rate.



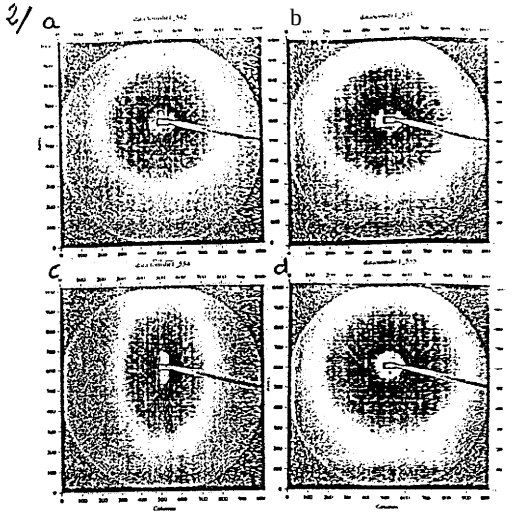




Figure caption:

Fig 1: Shear diagram: (tumbling, alignment) from isotropic to cholesteric phase

Fig 2 : Low shear: radial (a), tangential (b); high shear: radial (c), tangential (d)

Fig 3 : I(q) vs q for volume fraction 5.6% volume fraction showing the first and second order peaks.