

# Structure and dynamics of swollen polyacrylamide ferrogels

J.A. Galicia, F. Cousin, E. Dubois, O. Sandre, V. Cabuil and R. Perzynski

UPMC Paris 6 – Laboratoire PECSA – UMR 7195 CNRS-UPMC-ESPCI  
Case 51, 4 Place Jussieu – 75252 Paris Cedex 05 – France

The local structure of hybrid ferrogels resulting from the incorporation of  $\gamma\text{-Fe}_2\text{O}_3$  nanoparticles in a polyacrylamide polymeric network is probed from a static and a dynamic point of view, in various synthesis conditions and at swelling equilibrium [1, 2, 3].

Relaxation of magneto-optical birefringence and Small Angle Neutron Scattering measurements show an adsorption of the nanoparticles onto the polymer ascribed to H-bonds. These measurements allow sorting out the conditions leading either to a homogeneous scaffold reinforced by the nanoparticles or to a nano-structured composite with a 2D nanoparticle decoration on the walls of percolating pockets, initially filled by the ferrofluid during the synthesis and leaking out during the swelling.

[1] J.A.Galicia, O. Sandre, F. Cousin, D. Guemghar, C. Menager, V. Cabuil, *J. Phys. Cond. Matter* 15 (2003) S1379

[2] J.A.Galicia, F. Cousin, E. Dubois, O. Sandre, V. Cabuil, R. Perzynski, *Soft Matter* 5 (2009) 2614-2624

[3] J.A.Galicia, F. Cousin, E. Dubois, O. Sandre, V. Cabuil, R. Perzynski, *J. Mag. Mag Mat.* (to appear in 2010)