

## Clay/polymer hybrid hydrogel: adsorption of polymer adsorption at the interface

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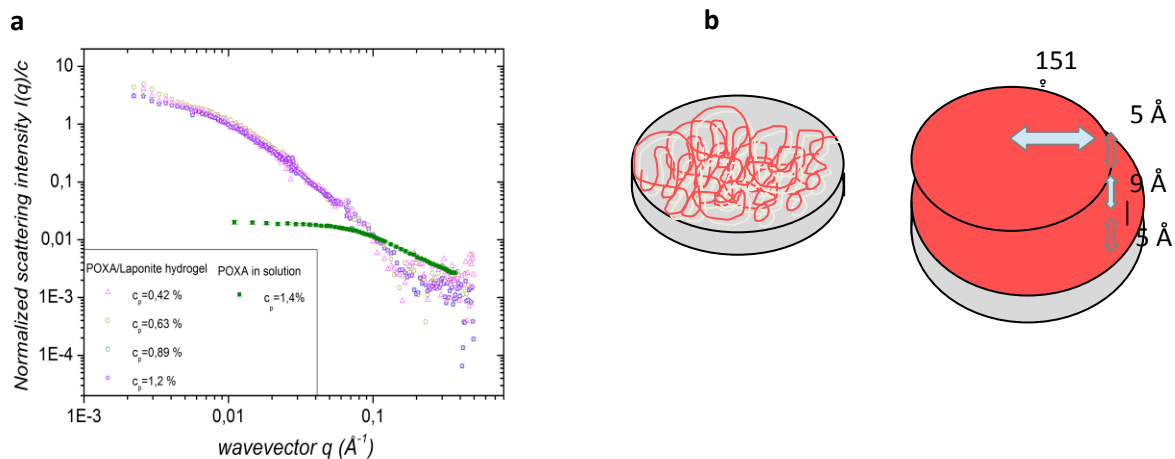
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The addition of nanoparticles in polymer solutions, gels or solid materials has been used to modify mechanical properties of materials. Such materials present a growing interest during past decades and have led to very different applications in fields such as painting, cosmetics, therapeutics...

One of the key roles to control mechanical properties of such materials is played by the adsorption of polymer on nanoparticles. The interface between polymer and inorganic particles is particularly important to control dispersion of particles and mechanical properties of hybrid materials. In this context the use of clays presenting a large surface such as laponite has been investigated as a model for inorganic nanoparticles with large interface.

In this presentation, we have chosen to study a system composed of laponite, inorganic clay which is known to form hydrogels at low concentration (around 2 wt%). Properties of these hydrogels would be modified by the addition of polymer in solution. The combination of NMR and SANS (fig 1) shows that Poly(ethylene glycol) (PEG) and poly(methyl oxazoline) (POXA) present really different adsorption on clays. This difference of adsorption leads to really different rheological compartment. Whereas the elastic modulus of gel decreases with the addition of PEG, its compartment is really surprising with the addition of POXA. With the help of DNPA, we tried to correlate these surprising mechanical properties to polymer structure at the interface of laponite (fig 1 b).

**Figure 1:(a)** Intensity scattered by SANS for laponite/POXA hydrogels. Laponite has been matched in



solvent. **(b):** Schematic representation of polymer flatly adsorbs on clay. POXA takes the shape of laponite with a thickness of 5 Å on each edge.