



	<b>Experiment title:</b> Kinetics of volume phase transition in PNIPA gels	<b>Experiment number:</b> 02-01-665
<b>Beamline:</b> BM2	<b>Date of experiment:</b> from: 25-06-2005 to:30-06-2005	<b>Date of report:</b> 27-02-2006
<b>Shifts:</b> 12	<b>Local contact(s):</b> E.Geissler	<i>Received at ESRF:</i>

**Names and affiliations of applicants (\* indicates experimentalists):**

- \*K. László, Department of Physical Chemistry, Budapest University of Technology
- \*C. Rochas, Laboratoire de Spectrométrie Physique, Université J. Fourier de Grenoble
- \*E.Geissler, Laboratoire de Spectrométrie Physique, Université J. Fourier de Grenoble

### **Report:**

The aim of this experiment was to observe differences in the static and kinetic properties of poly(NIPA) hydrogels during deswelling, when raised above the critical temperature of the volume phase transition.

To explore the requisite wide  $q$ -range, the measurements were performed at two incident energies, 8 keV and 16 keV, with sample-detector distances ranging between 2 m and 0.29 m. Several different samples were tested, notably NIPA hydrogels in pure water, in water containing either phenol or phloroglucinol, and also in PNIPA gels that were functionalized either with allyl phenol or with a specially designed 18 unit crown ether. The purpose of the substituents is to enhance the absorption capacity of the gels for phenols. Significant differences were found among the different samples, at various levels, as illustrated for example in Figure 1, where the  $q^{-4}$  surface scattering behaviour of the phenol-containing sample extends to higher  $q$  than for the same gel in pure water. The rate of deswelling was found to be similar to that of the sample in pure water. The substituted gels, on the other hand, were found to deswell fast, presumably owing to the disorder introduced into the network by the functional groups.

These measurements are in the process of being written up and will be submitted, together with other results from the thesis work of Katalin Kosik, either to *Macromolecules* or *Polymer*

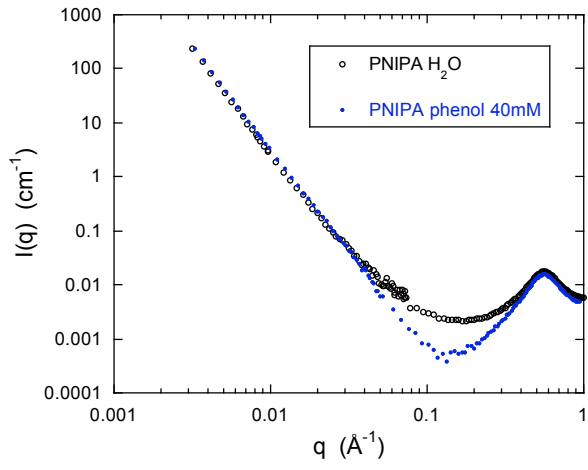


Figure 1 SAXS spectrum of PNIPA gel at 40°C with and without phenol.