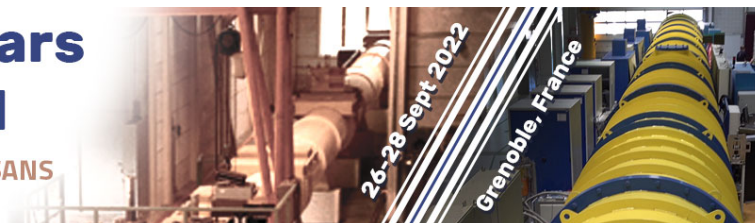


# 50 years of D11

A history of SANS  
at the ILL



Contribution ID: 11

Type: **Invited speakers**

## Contribution of SANS and particularly of D11 on the understanding of thermoreversible gelation

Wednesday, 28 September 2022 11:15 (25 minutes)

Being among the first users of D11, I will give during my talk an outlook of the topics I investigated with this SANS camera. My first use of D11 dates back to Mai 1975 for studying the chain conformation in a crystalline polymer, namely isotactic polystyrene (iPS). Unlike polyethylene, that was studied simultaneously by other group of scientists, iPS did not display any isotopic segregation so that the single chain behaviour could be determined. We showed that the chain conformation depends on the crystalline growth rate with respect to the polymer viscosity. The chains fold completely in single crystals grown from dilute solutions while there is an alternation of folded parts and amorphous part in the bulk state. Our studies in polymer thermoreversible gels displaying fibrillar morphology have shown that the chain possesses a persistence length much larger than that observed in the usual flexible state. We could show that this is due to helical stabilization through the formation of polymer/solvent molecular compounds. We could further show that a larger persistence length appears as a prerequisite for the formation of polymer thermoreversible gels.

We also investigated hybrid polymer thermoreversible gels/self-assembled systems. We could highlight the encapsulation of a bicopper complex by polymer fibrils, or the sheathing of polymer fibrils by self-assembled nanotubes.

### Some references

- J.M. Guenet A neutron scattering study of the chain trajectory in isotactic polystyrene single crystals. *Macromolecules*, 1980, 13, 387
- J.M. Guenet A neutron scattering investigation of the chain trajectory in thermoreversible gels. *Macromolecules*, 1987, 20 2874
- M. Klein, A. Brulet, J.M. Guenet Molecular structure in isotactic polystyrene thermoreversible gels. *Macromolecules* 1990, 23, 540.
- J.M. Guenet, A. Brulet, C. Rochas Agarose chain conformation in the sol state by neutron scattering *Int. J. of Biol.Macromol.* 1993, 15, 131
- D. Lopez, J.M. Guenet Encapsulation of filaments of a self-assembling bicopper complex in polymer nanowires. *Eur. Phys. J. B* 1999, B12, 405
- S. Malik, C. Rochas, J.M. Guenet Syndiotactic Polystyrene/Naphthalene intercalates: preparing thermoreversible fibrillar gels from a solid solvent *Macromolecules* 2005, 38, 4888
- D. Dasgupta, Z. Kamar, C. Rochas, M. Dahmani, Ph. Mesini, J.M. Guenet Design of hybrid networks by sheathing polymer fibrils with self-assembled nanotubules *Soft Matter* 2010, 6, 3576
- A. Boulaoued, J.-L. Bantignies, R. Le Parc, C. Goze-Bac, P. Mesini, T.-T.-T. Nguyen, A. Al Ouahabi, P. Lutz, J.-M. Guenet Hybrid fibrillar xerogel with unusual magnetic properties *Langmuir* 2016, 32, 13193

**Primary author:** GUENET, Jean-Michel (CNRS Institut Charles Sadron)

**Presenter:** GUENET, Jean-Michel (CNRS Institut Charles Sadron)

**Session Classification:** Talks