Report of Conference on:

ARRESTED GELS – DYNAMICS, STRUCTURE and APPLICATIONS,
Cambridge, 23-25 March, 2015

This conference was held at Gonville and Caius College, Cambridge and was organized by the RSC Colloid and Interface Science Group and the SCI Colloids and Surface Chemistry Group. The meeting was also sponsored by the Industrial Physical Chemistry Group which provided financial support of £ 1,000. This sponsorship made the meeting more accessible to all participants and especially students.

The meeting was concerned with the structure and properties of gels or complex fluids – in particular in the non-equilibrium state which occurs under flow conditions. Such materials in the gel state can be considered to have physical properties which are intermediate between those of free-flowing liquids and rigid solids. They may exhibit complex rheological behaviour such as viscoelasticity and thixotropy for example. Gel formulations are used widely in industry: cosmetics, paints, foods, drilling fluids. The design of formulation properties is often critical to their application but still remains poorly understood. Such gel formulations may be derived in many ways: polymer solutions, liquid crystal surfactant phases or colloidal dispersions of nanoparticles (eg. sol/gel systems). Recent progress in the understanding of the relationship between the macroscopic properties and the structure of gels on the meso and nanoscale has recently been made (for example using techniques such as light and neutron scattering which can probe the structure at the nano-scale).

The main objective of the meeting was therefore to address how the macroscopic properties of gels are controlled by nano scale structure under dynamic conditions – aspects which are poorly understood and difficult to study. It was considered that such an understanding would allow more advanced 'gel' formulations to be designed on a more scientific basis rather than from an empirical approach. As this objective to 'engineer' a desired microstructure and bulk properties requires a multidisciplinary input it was hoped the meeting would attract a wide interest (theorists, physicists, chemists, engineers, experimentalists, formulation scientists and industrialists), both from those working in the UK and abroad. In this respect the meeting more than achieved expectation.

The programme of the meeting extended over three days and included 29 oral papers including 6 invited speakers. There was also a Poster session with 15 presentations, with an emphasis on contributions younger post docs. (A prize for the best presentation from a young research student was made)

The invited papers were the following:

P. Schurtenberger, Lund University, Sweden
Colloidal gels with tailored properties- from transient networks to arrested spinodal decomposition structures

D. Bonn, Amsterdam University, Netherlands
Colloidal gels, glasses and attractive glasses

L.Cipelletti, Montpellier University, France
Microscopic dynamics of colloidal gels from spontaneous anomalous relaxations to stress induced creep and failure

W.J.Frith, Unilever, UK
Self assembly of small molecules and the formation of arrested gels

L.Berthier, Montpellier University, France
Intermittent ageing dynamic and logarithmic coarsening in non-equilibrium gels

H.Tanaka, Tokyo University, Japan
Colloidal gelation as viscoelastic phase separation

The conference attracted nearly 80 delegates both from university and industry. The number of participants from industry was 27 – and unusually high for such a meeting. Overseas participation was (18): mostly from Europe, but also from USA, Canada, and Japan.

In summary this conference was very successful and the scientific programme of a high scientific standard. The topic embraced both academic and industrial research interests and in this respect was especially appropriate for an involvement and support from the IPCG. The support from the IPCG was much appreciated by the organizers from both RSC and SCI and it was a privilege on my behalf to represent the IPCG at the conference.

In discussion and further contact with the organizers it was agreed to explore the possibility of a future Faraday Discussion meeting with a similar theme. The IPCG involvement here would be welcome. The possibility of running a joint meeting between IPCG and the RSC/SCI Joint Colloid Group has also been discussed with Peter Dowding (Chairman), who is keen to pursue the possibilities here.

As regards attracting new members for the IPCG Committee, contact was made with participants at the conference who may be able to join the Committee. I will explore possibilities for a participant from Industry to become a member if this is agreed. I hope to report at our next IPCG Committee in the Autumn of 2015 on developments on this.

J D F Ramsay, CChem, FRSC

Montpellier, 17 June 2015