

International Webinar on Gels and Networks



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Polymeric gel, where structure matters

ABSTRACT: Composed mostly of small solvent molecules and loosely connected polymer networks, polymeric gels appear and feel like liquid solution. It is natural to ask the question: are the mechanical properties of a polymeric gel fully determined by its chemical composition, including the concentrations of monomer, solvent, crosslinkers, etc., or would the synthesis condition and process affect its network structure and further the macroscopic properties? Through carefully planned experiments, we systematically studied the mechanical properties of a set of compositionally identical hydrogels prepared through different processes. A strong dependence of the elastic properties of polymeric gels on the synthesis conditions was observed, and the results well captured by a set of scaling relations derived from the theory of semi-dilute solutions and the proposed network structures. Further, the fracture of polymeric gels was studied, and some intriguing relations between the intrinsic fracture energies under various loading and swelling conditions were identified.

GOALS:

- Understand the relation between macroscopic mechanical properties and network structures.
- Explore the possibilities of strengthening or toughen a polymeric gel just by optimizing the synthesis processes.

ABOUT THE WEBINAR:

Due to the ongoing global crisis involving COVID-19, there is little chance for the soft matter community to meet to learn about gels and networks. We propose this seminar as a way for members of the European and Asian communities to share our research and learn from each other, even when social distancing is necessary. The tone of this webinar is informal, and questions can be freely asked at any time. We welcome open discussion, and hope that all who attend will learn a lot!

Webinar website: <http://www.fp.a.u-tokyo.ac.jp/lab/sozai/seminar.html>

Registration:

<https://u-tokyo-ac-jp.zoom.us/meeting/register/tZ0uce-vrT4oG9IRWPZj-6VPodDS17zSvACD>

Date: Wednesday, December 15th, 2021

Time: 17:00-18:30 JST, 9:00-10:30 CET

Cost: Free

Organizers:

Daniel King (Hokkaido University)

Koichi Mayumi (University of Tokyo)

Tetsuo Yamaguchi (University of Tokyo)

Tetsuharu Narita (ESPCI Paris)