

International Webinar on Gels and Networks



Xiang Li – Assistant Professor

ISSP, University of Tokyo

x.li@issp.u-tokyo.ac.jp

Nanostructures of polymer gels – towards highly homogeneous gels

ABSTRACT: Fabrication of ordered nanostructure is a crucial step in a wide range of fields, although the typical size of these objects is still limited to a scale of μm^3 even with current technologies. Polymer gels are a familiar soft material consisting of a nanoporous three-dimensional network that is readily prepared in a large scale, in principle unlimited. However, application of gels as a nanostructured object is obstructed by the fact that gel networks inevitably have a significant level of defects including dangling ends, loops, entanglements, and nonuniform pore sizes, as a result of the fully stochastic gelation reaction.

In this study, we break this preconception: we present a simple but yet universal scheme to fabricate polymer gels with a highly ordered network. Our strategy is to bring a geometric constraint into the pregel solution so that the space is always uniformly filled with the starting polymer units throughout the gelation reaction. This gelation framework is known as “bond-percolation” in the classical percolation theory.

GOALS:

- Fabricate homogeneous and simple gel networks without defects
- Understand the relationship between the mechanical properties of gels and their nanostructures using the defect-less gels

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://zoom.us/meeting/register/tJEoc-ygpj4tEtrdJTdHfoS8GpR2dip745J>

Date: Monday, February 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)