

International Webinar on Gels and Networks



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Diffusio-mechanical coupling -Elastic effects in the diffusion of gels and polymer solutions-

ABSTRACT:

A gel placed in a solvent swells absorbing solvent from the surrounding. This process is a kind of diffusion since polymer molecules are diffusing into solvent, or solvent molecules are diffusing into polymer network. The diffusion in gels generally involves deformation of polymer network and is coupled with elasticity of the network. Such coupling is called diffusion-mechanical coupling. The diffusion-mechanical coupling is also important in the liquid state of polymers (polymer melts and solutions), where polymer molecules form a temporary network by entanglement.

In this talk, I will demonstrate how to handle the diffusion-mechanical coupling in elastic and viscoelastic materials. The topics to be discussed are

- (a) Swelling and bending dynamics of sheet-like gel: cooperative diffusion constant revisited.
- (b) Mechanical instability of a filament of gels and polymer solutions: power of Onsager principle.
- (c) Case II diffusion: complexity in diffusion

Point to be made:

- There are still many unsolved and challenging problems in the phenomena of diffusion.

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/tZcod-mpqzkuH9QZMdFU2zO87cILj4hhuw8C>

Date: Wednesday, October 6th, 2021

Time: 17:00-18:30 JST, 10:00-11:30 CET

Cost: Free

Organizers:

Daniel King (Hokkaido University)

Koichi Mayumi (University of Tokyo)

Tetsuo Yamaguchi (University of Tokyo)

Tetsuharu Narita (ESPCI Paris)