Faculty of Engineering
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Development of Stimuli-responsive Intelligent Polymer Materials

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Temperature response:
Reversible physical gelation of a polymer solution

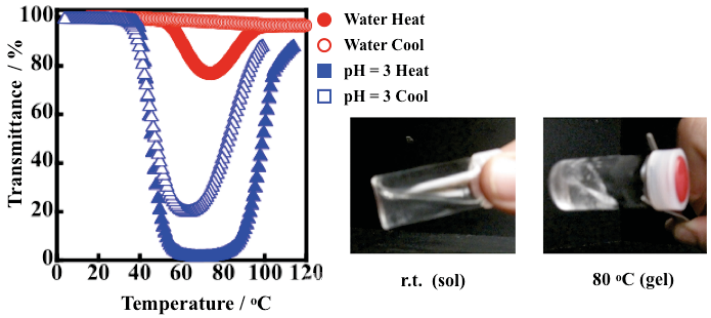
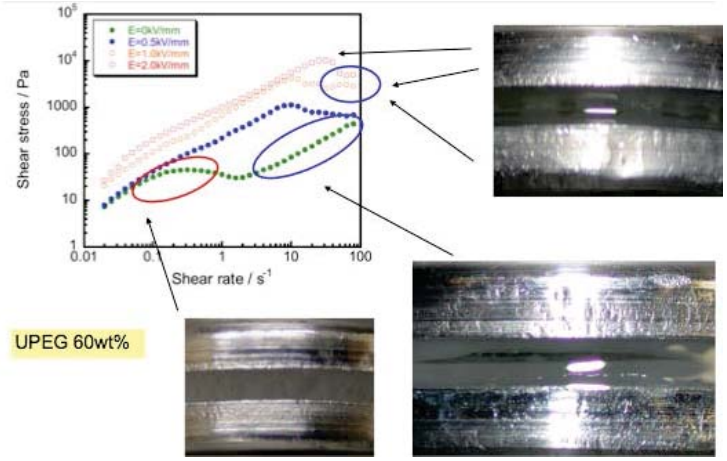


Fig. Temperature-transmittance curves of 0.5 wt% of P(NnPAM25-*co*-AA75) solution. without Na_2SO_4 (1 °C/min)

Electric-field response:
Viscoelasticity change of an immiscible ER fluid



Content:

1. Thermoresponsive polymers

Various substituted vinyl polymers showing a temperature-sensitive soluble-insoluble transition in water have been preprared. These polymers have unique characteristics such as extraordinary large hysteresis in the temperature-induced phase transition. Copolymers based on these polymers can furthr modify the interesting properties, e.g., double-responsibility to temperature and pH, physical gelation, and controllable hysteresis.

2. Electrorheological fluids (ER fluids)

Suspensions and immiscible liquid blends, which show a reversible change in rheological property under an electric field, have been prepared. These fluids are called electrorheological fluids (ER fluids). Various polymers and inorganic componuds can be used as the materials of ER fluids. The controllable rheological properties by an electric field are expected to be useful for design of smart devices.

Keywords : thermosensitive polymer, ER fluid, rheology

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