Conduction through Thermosensitive Networks

Rekha Goswami Shrestha[1], Rintaro Higuchi[1], Yoshitaka Shingaya[1], Sadaaki Samitsu[2] and Tomonobu Nakayama*[1]

[1]Nano Functionality Integration Group, International Center for Materials Nanoarchitectonics (MANA), National Institute for Materials Science (NIMS), 1-1 Namiki, Tsukuba, Ibaraki 305-0044, Japan, [2.] Separation Functional Materials Group, Polymer Materials Unit, Advanced Key Technologies Division, National Institute for Materials Science (NIMS), 1-1 Namiki, Tsukuba, Ibaraki 305-0044, Japan

E-mail: Goswami.Shrestharekha@nims.go.jp

Abstract:

A gel formed in surfactant mixture possesses entangled networks. An incorporation of polymer into this gel retains these entangled networks. This incorporation of polymer in surfactant mixture enhances rheological properties of networks formed by surfactant mixtures only: like viscosity, elasticity and relaxation time as confirmed by rheological measurements. The rheological property of both gels is dependent on concentration of components, temperature. The polymer-incorporated gel possesses enhanced conducting properties. Measurements show that the conductivity is sensitive to temperature, concentration of components. Interesting temperature dependent potential and current distribution pattern were observed through the network in the matrix of gel. These temperature dependent pattern were assigned to the temperature induced structural transformation in the gel.

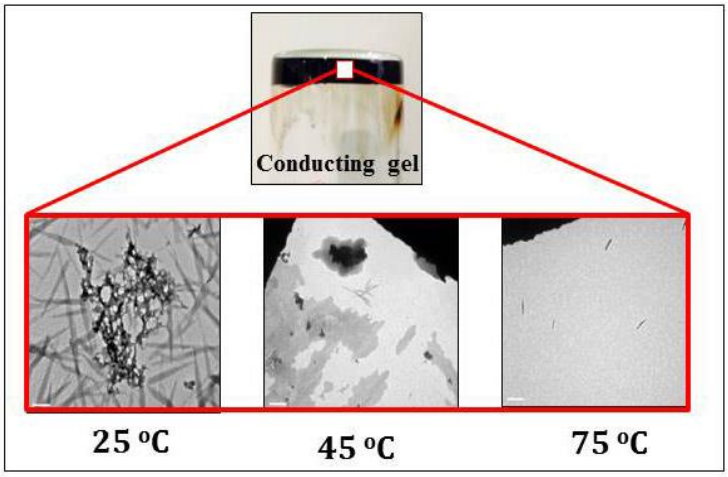

Figure1. Self-Standing Conducting Gel (above), and TEM images of the gel at different temperatures (below).