Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Thermoreversible Transition between Nanophase- and Macrophase-Separation from Block Supramacromolecules via Hydrogen Bonding in an Ionic Liquid ATSUSHI NORO, Nagoya University, HAJIME YAMAGISHI, YUSHU MATSUSHITA — We investigate thermoreversible transition between nanophase- and macrophase-separation from block supramacromolecules in an ionic liquid induced by association-dissociation of two macromolecules with hydrogen bonding end-linkers, where supramacromolecules are termed as supramolecular assembly of macromolecules via non-covalent bonding. A thermally stable ionic liquid with negligible vapor pressure, 1-ethyl-3-methylimidazolium bis(trifluoromethylsulfonyl) imide, was used as a solvent to attain the molecular mobility of the system under better control. Two macromolecular building blocks were prepared: one is a poly(trimethoxystyrene) with a small end-linker of poly(hydroxystyrene) (M_n = 53k) and the other is a poly(butyl acrylate) with a small end-linker of poly(vinylpyridine) (M_n = 54k), both of which dissolve in the ionic liquid. Phenol should be hydrogen-bonded with pyridine. Nanophase-separated structure was observed in the ionic liquid solution of the blend by small-angle X-ray scattering at 30 °C, because of the formation of block supramacromolecules. But there are no scattering peaks above 90 °C in X-ray profiles: The sample is causing macrophase separation. It has also been found that the formation of supramacromolecules is thermoreversible due to hydrogen bonding.

Atsushi Noro
Nagoya University

Date submitted: 16 Nov 2009 Electronic form version 1.4