

Supporting Information

Thermo-responsive gels based on supramolecular assembly of an amidoamine and citric acid

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Characterization of chemical structure

ATR-FTIR spectroscopic studies were also carried out to investigate chemical structure before and after heating and the formation of thermo-responsive supramolecular amphiphile system, which indicated that a number of spectral changes occurred during gelation, shown in Figure S1.

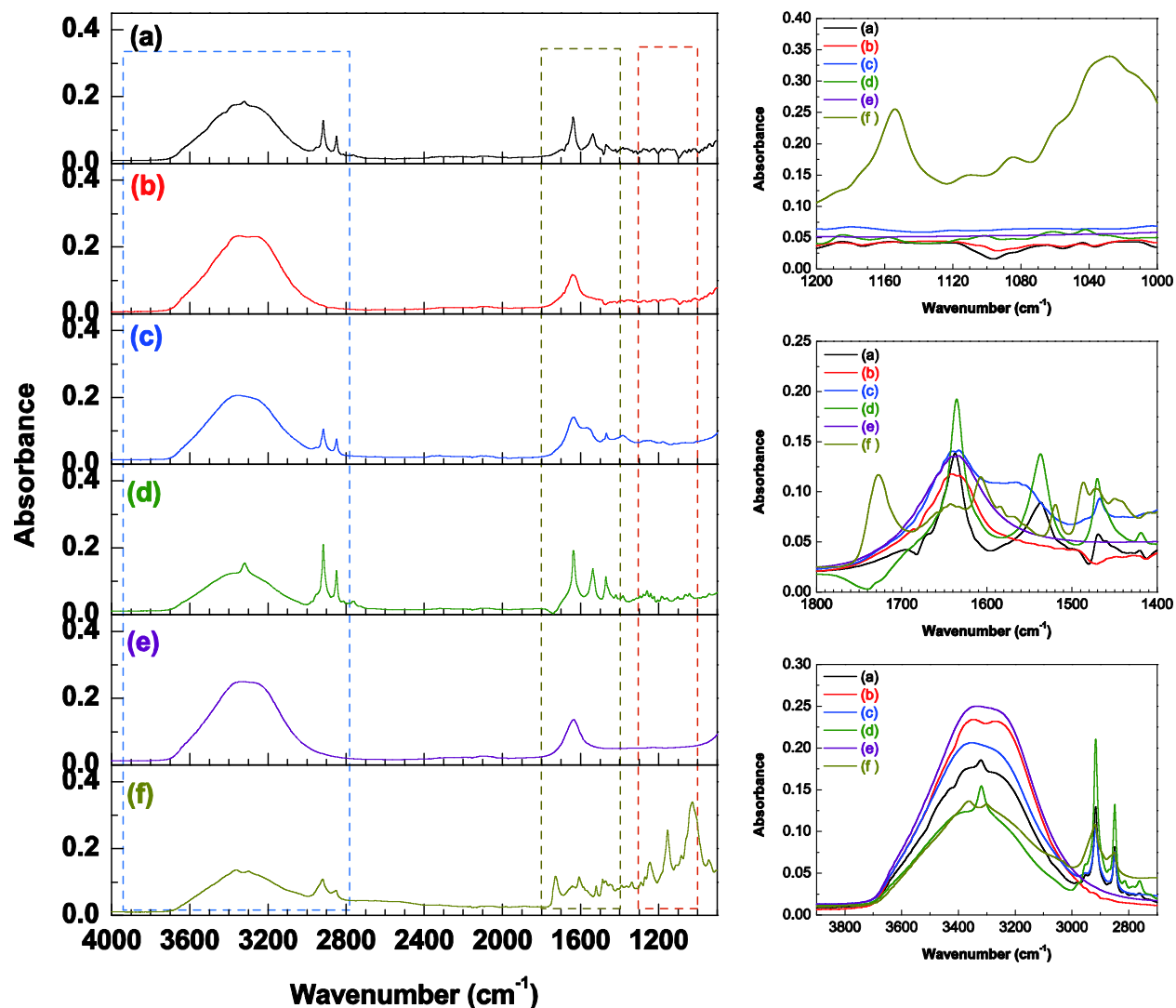


Fig. S1 ATR-FTIR spectra of (a) amino-amide **A** aqueous solution at room temperature; (b) citric acid aqueous solution at room temperature; (c) thermo-responsive supramolecular **C** at room temperature; (d) amino-amide **A** aqueous solution at 90 °C; (e) citric acid aqueous solution at 90 °C; (f) thermo-responsive supramolecular **C** at 90 °C.

The chemical structures of amino-amide **A** and citric acid were characterized by ATR-FTIR spectroscopy analysis. The ATR-FTIR spectra were shown in Figure S2. The main peaks of amino-amide **A** were observed at 3308 cm^{-1} (NH str.), 2908, 2845 cm^{-1} (CH str.), 1638 cm^{-1} (C=O str.), 1547 cm^{-1} (NH bend), 1460, 1375 cm^{-1} (CH bend), 1036 cm^{-1} (CN str.). The main peaks of citric acid were observed at 3497 cm^{-1} (OH str.), 3273 cm^{-1} (CH), 1740 cm^{-1} (C=O str.), 1688 cm^{-1} (C=O str.), 1427 cm^{-1} (C-O-H bend), 1383 cm^{-1} (C-O-H bend), 1352 cm^{-1} (C-O-H bend), 1233 cm^{-1} (C-O str.), 1213 cm^{-1} (C-O str.), 1192 cm^{-1} (C-O str.), 1167 cm^{-1} (C-O str.), 1130 cm^{-1} (C-O str), 1078 cm^{-1} (C-O-H str), 1045 cm^{-1} (C-O-H str), 932 cm^{-1} (C=O bend).

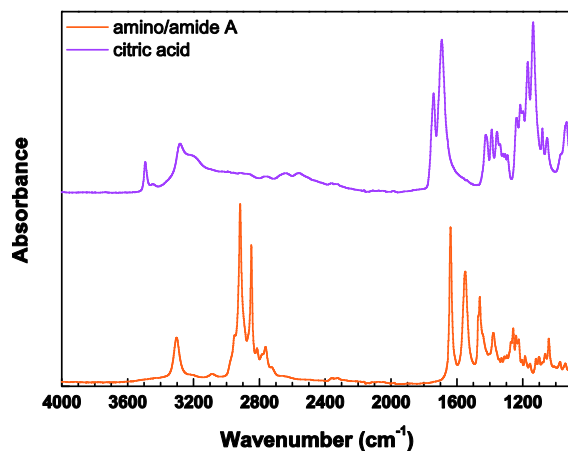


Fig. S2 ATR-FTIR spectra of amino-amide **A** and citric acid at room temperature.

Thermal property analysis

Figure S3 demonstrates the temperature-dependent hydrodynamic diameters in amino-amide **A** aqueous solution upon heating from 23 °C to 90 °C. The hydrodynamic diameter, which is the indicator of characteristic size of supramolecular assembly, increased with increasing temperature in the range of 23 °C to 62°C. At higher temperatures, the hydrodynamic size gradually decreased and fully vanished in the range of 85-90°C. Since we do not know the exact

morphology of the assembly and the reported size is based on the assumption of a spherical shape, we use the hydrodynamics size only for a comparison purpose. The solution A became clear yellow upon heating from room temperature to 90 °C as can be seen from Figure 1.

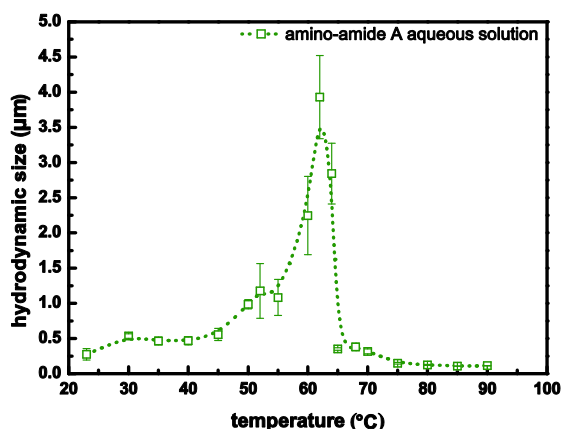


Fig. S3 Hydrodynamic size of supramolecular system involving amino-amide as a function of temperature

Rheological characteristics

In this work, we also investigated the viscoelasticity of supramolecular system with concentration of 2.5 wt%. In Figure S4, the storage modulus (G') and loss modulus (G'') were monitored over the frequency in the range of 0.01-100 Hz at three different temperatures, which indicated that the supramolecular system still exhibited obvious gelation behavior upon increasing temperature even with 2.5 wt% concentration.

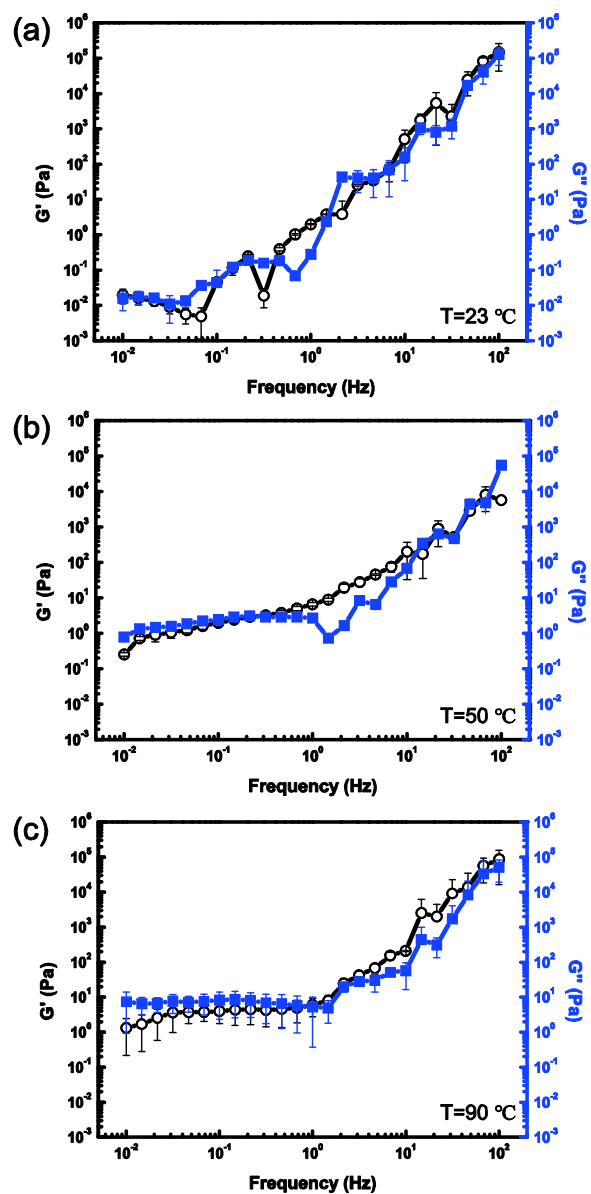


Fig. S4. Storage (G') and loss (G'') moduli of thermo-responsive supramolecular amphiphile system with amino-amide concentration of 2.5 wt% at (a) 23°C, (b) 50°C, and (c) 90°C.