Supporting Information

Effects of surfactant and urea on dynamics and viscoelastic properties of hydrophobically assembled supramolecular hydrogel

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Characteristics of the synthesized segmented copolymer PE PEG2000

Table S1. Characteristics of the segmented copolymer (obtained by Gel Permeation Chromatography)

sample	M_w (kg/mol)	M_n (kg/mol)	M_w/M_n
PE PEG2000	87	42	2.07

Strain-dependent measurements

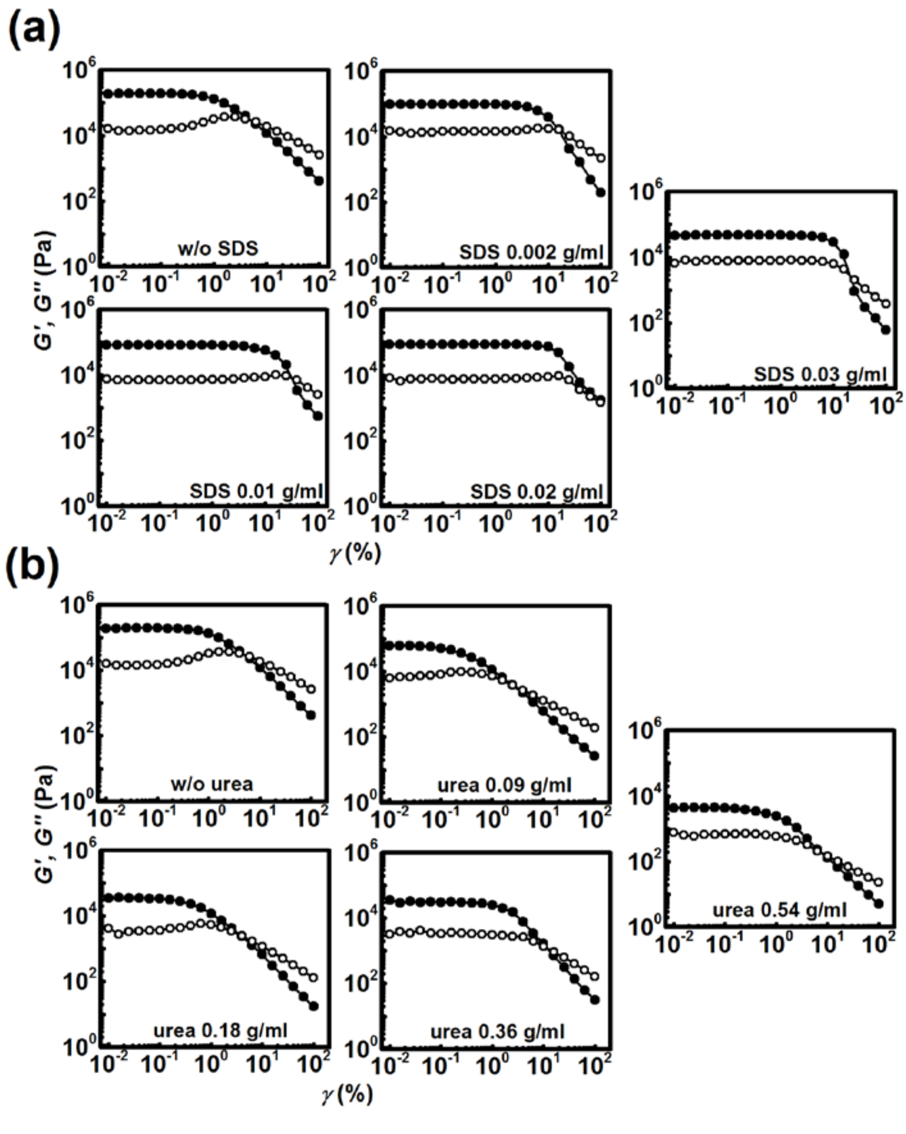

Figure S1. Viscoelastic properties of hydrogels in the presence of SDS and urea. Strain sweep at ω=1 rad/s, at 25°C of the PE PEG2000 at (a) varying SDS concentrations and (b) varying urea concentrations, as indicated in the panels (closed symbols *G*', open symbols *G*'').

Analysis stress relaxation data

The frequency-dependent viscoelastic moduli $G'(\omega)$ and $G''(\omega)$ can be derived directly from the Fourier transform of a stress relaxation test, as

$$G^*(\omega) = i\omega \int_0^\infty G(t)\, e^{-i\omega t} dt, \qquad (1)$$

where $G(t) = \sigma(t)/\gamma_0$ is the time-dependent modulus, with σ(t) the time dependent stress after a step in the strain of magnitude γ_0. $G'(\omega)$ and $G''(\omega)$ are the real and imaginary parts of $G^*(\omega)$, respectively.

Brief description of the Matlab function 'Gstar_from_G_t'

The MATLAB function Gstar_from_G_t.m calculates $G^*(\omega)$ from $G(t)$, using Eq.1. As the experimental data for *G(t)* is always limited to a finite range of time scales, the code extrapolates $G(t)$ at short and long times, beyond the range that was measured experimentally. To do so, the code uses a power-law fit to both the upper and the lower end of the measured G(t)[1]. The data in between are integrated exactly from the experimental data, assuming power-law behavior between consecutive data points. In each section, including the initial and final power-law regimes, the relevant contribution to the integral in Eq.1 is calculated, using the incomplete gamma function[2], which allows us to calculate the definite integral for each section.

Function description:

DESCRIPTION: Function that calculates the frequency-dependent storage and loss moduli from the time-dependent modulus.
The data (on a time interval [t_min .. t_max] is divided into sections, which are each approximated as a power-law function. The relevant Fourier integral for each of these sections can be calculated using the incomplete gamma function gammainc(x,a)
INPUT PARAMETERS:
t: Time array [s]
G_t: Time-dependent modulus G(t) [Pa]
OUTPUT PARAMETERS:
omega: Array of angular frequency [rad/s]
G_stor: Array of Storage modulus [Pa]
G_loss: Array of Loss modulus [Pa]

[1] The width of this upper and lower end of time scales is controlled by the parameter *sectionspan*, which is currently set to a value of 5 (which means that the width of the sections used for the power law fit spans over a factor of 5.
[2] in Matlab, this is implemented by the built-in igamma function.

Fourier transform of the stress-relaxation responses in urea-containing samples

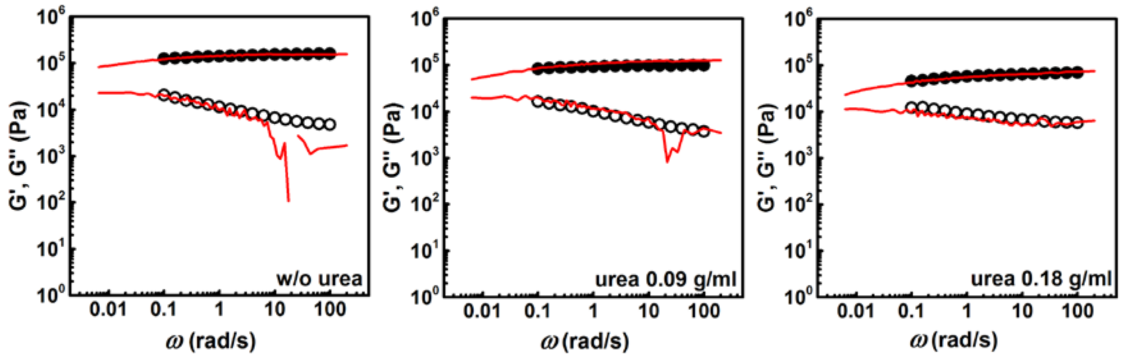

Figure S2. Fourier transform of the stress-relaxation responses in urea-containing samples. Storage and loss modulus $G'(\boldsymbol{\omega})$ and $G''(\boldsymbol{\omega})$ as a function of frequency. Comparison of experimental data obtained from a frequency sweep (symbols), and data obtained from Fourier transforming the stress-relaxation data shown in Figure 5b in the main text (red lines). Varying urea concentrations are indicated in the panels (closed symbols *G*', open symbols *G*'').