Linear Viscoelasticity and Time—Alcohol Superposition of Chitosan/Hyaluronic Acid Complex Coacervates

Supporting Information

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Table S1. Physical properties of the solvents used in this study.

Solvent	Melting point (°C)	Boiling point (°C)	Dipole Moment (Debye)	Dielectric Constant
Water	0	100	1.8546	80.1
Methanol	-97.6	64.7	1.70	32.7
Ethanol	-114.1	78.37	1.66	24.5
Isopropanol	-89	82.6	1.63	17.9

Table S2. Estimated dielectric constant for cosolvent mixtures.

Alcohol Content	Water	Methanol	Ethanol	Isopropanol
0 wt%	80.1	80.1	80.1	80.1
3 wt%	--	77.6	76.0	74.3
5 wt%	--	76.0	73.5	70.8
8 wt%	--	73.8	70.0	66.1

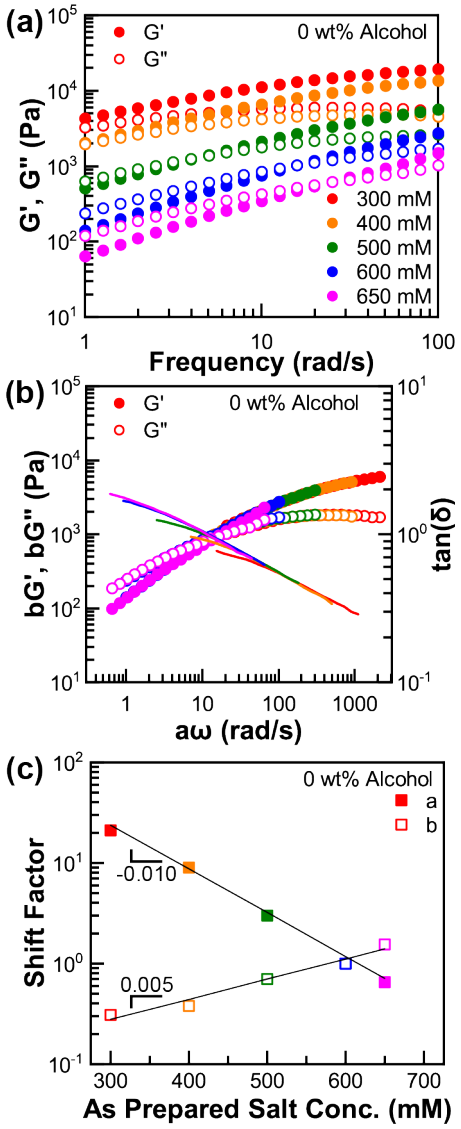

Figure S1. (a) Frequency sweep data for coacervates formed at varying salt concentrations in water, along with the **(b)** corresponding time-salt superposition plot and **(c)** a graph of the horizontal and vertical shift factors as a function of the as-prepared salt concentration. The data from 600 mM NaCl was used as the reference for the superposition. The exponential dependence of the shift factors as a function of the as prepared salt concentration is indicated as the slope of the linear fit on the semi-log plots.

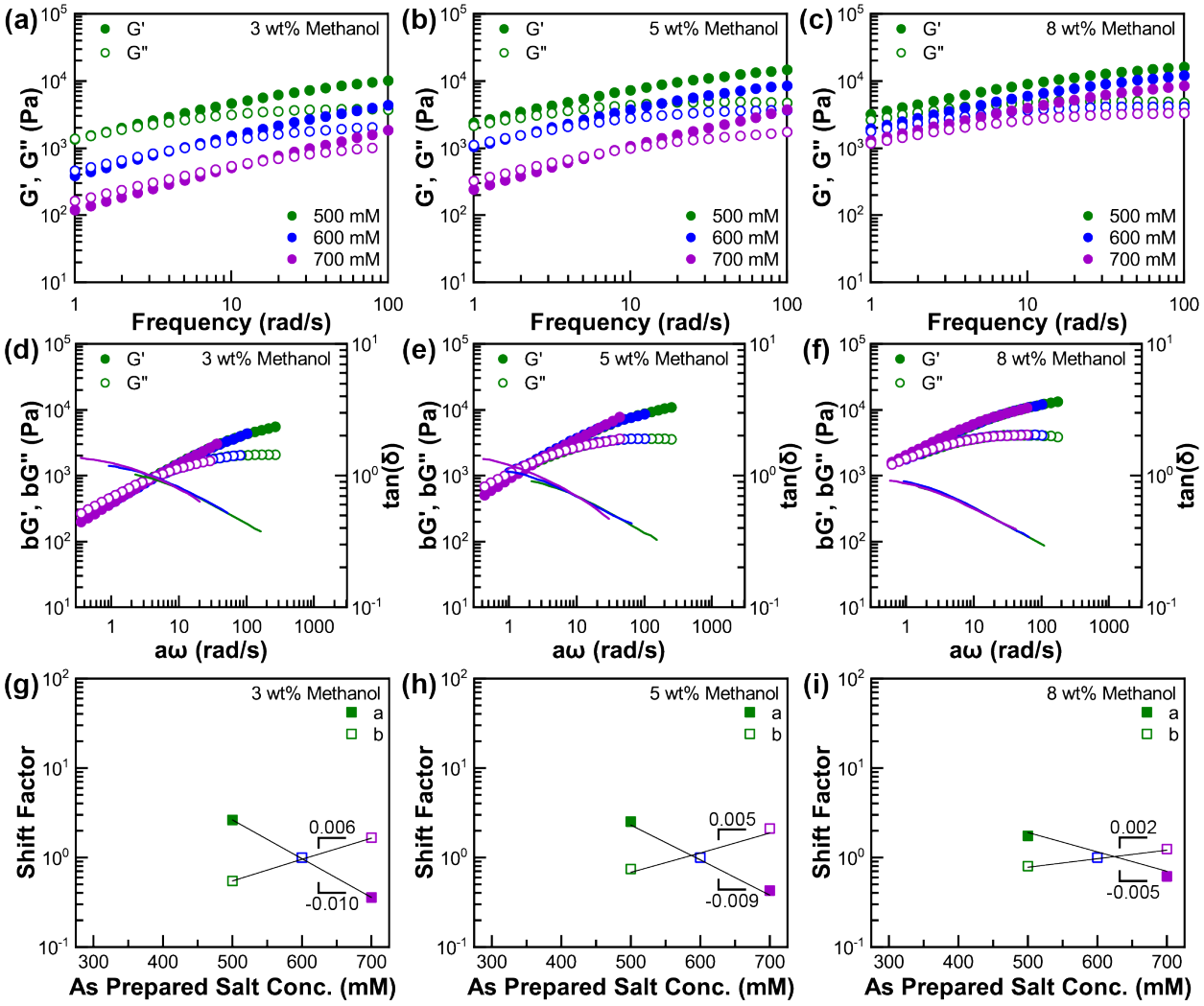

Figure S2. Frequency sweep data for coacervates formed at varying salt concentrations in **(a)** 3 wt% methanol, **(b)** 5 wt% methanol, and **(c)** 8 wt% methanol, along with the corresponding **(d-f)** the corresponding time-salt superposition plots and **(g-i)** graphs of the horizontal and vertical shift factors. The data from 600 mM NaCl for each sample was used as the reference for the superposition. The exponential dependence of the shift factors as a function of the as prepared salt concentration is indicated as the slope of the linear fit on the semi-log plots.

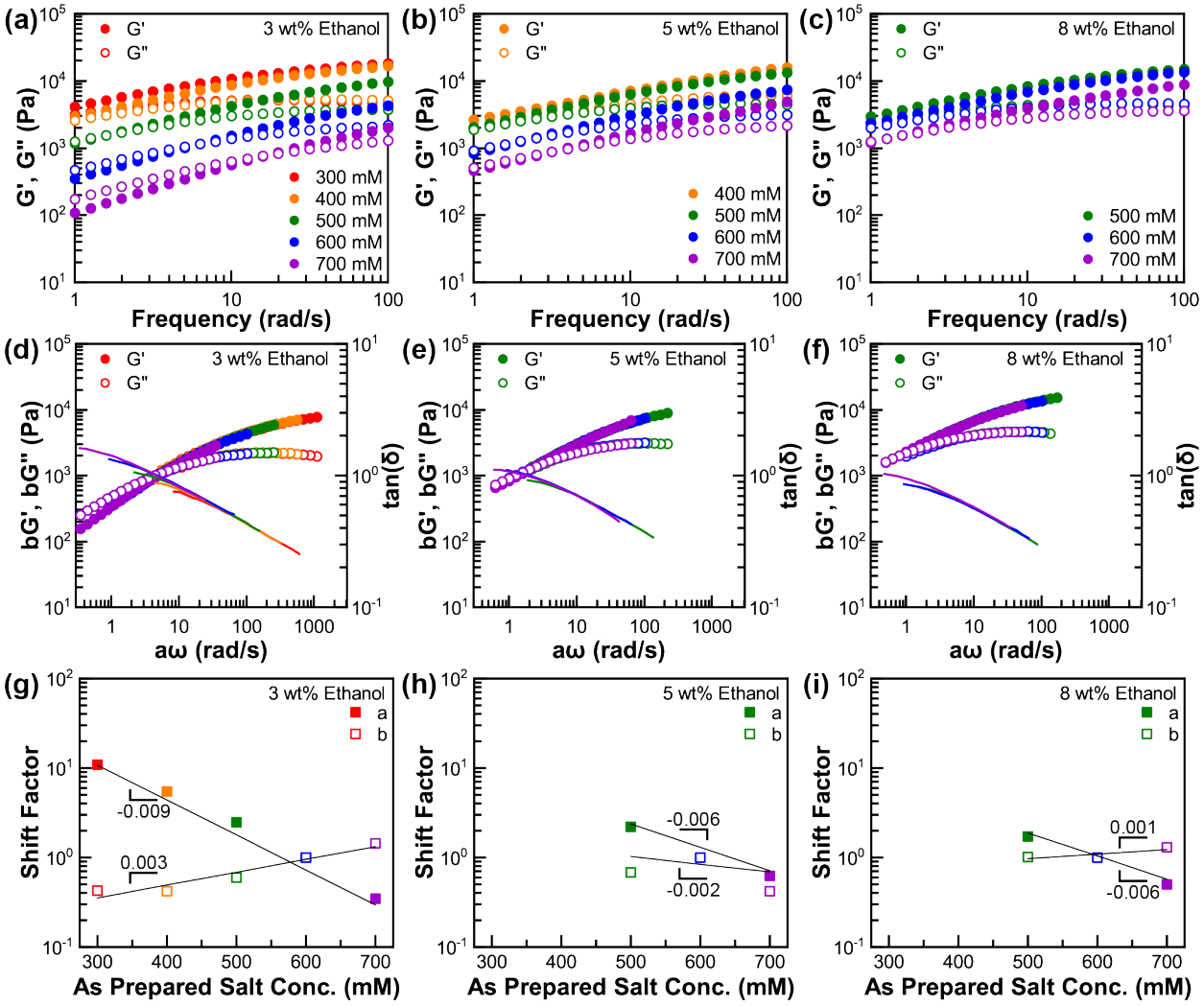

Figure S3. Frequency sweep data for coacervates formed at varying salt concentrations in **(a)** 3 wt% ethanol, **(b)** 5 wt% ethanol, and **(c)** 8 wt% ethanol, along with the corresponding **(d-f)** the corresponding time-salt superposition plots and **(g-i)** graphs of the horizontal and vertical shift factors. The data from 600 mM NaCl for each sample was used as the reference for the superposition. The exponential dependence of the shift factors as a function of the as prepared salt concentration is indicated as the slope of the linear fit on the semi-log plots.

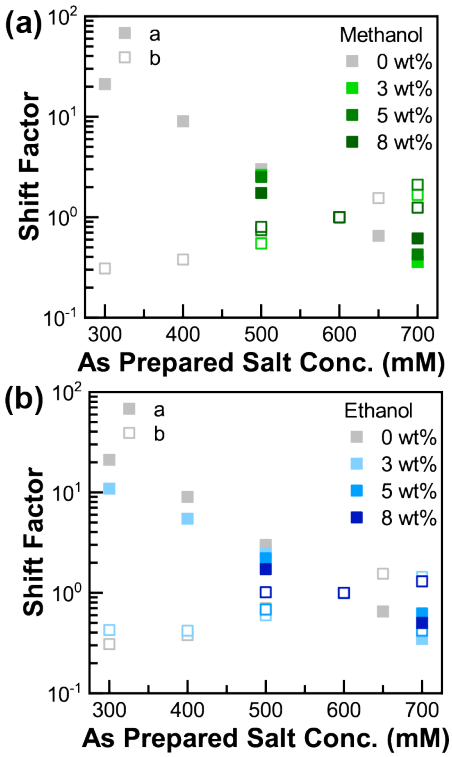

Figure S4. Plots of the horizontal and vertical shift factors as a function of the as-prepared salt concentration from time-salt superposition of the various **(a)** methanol and **(b)** ethanol samples.

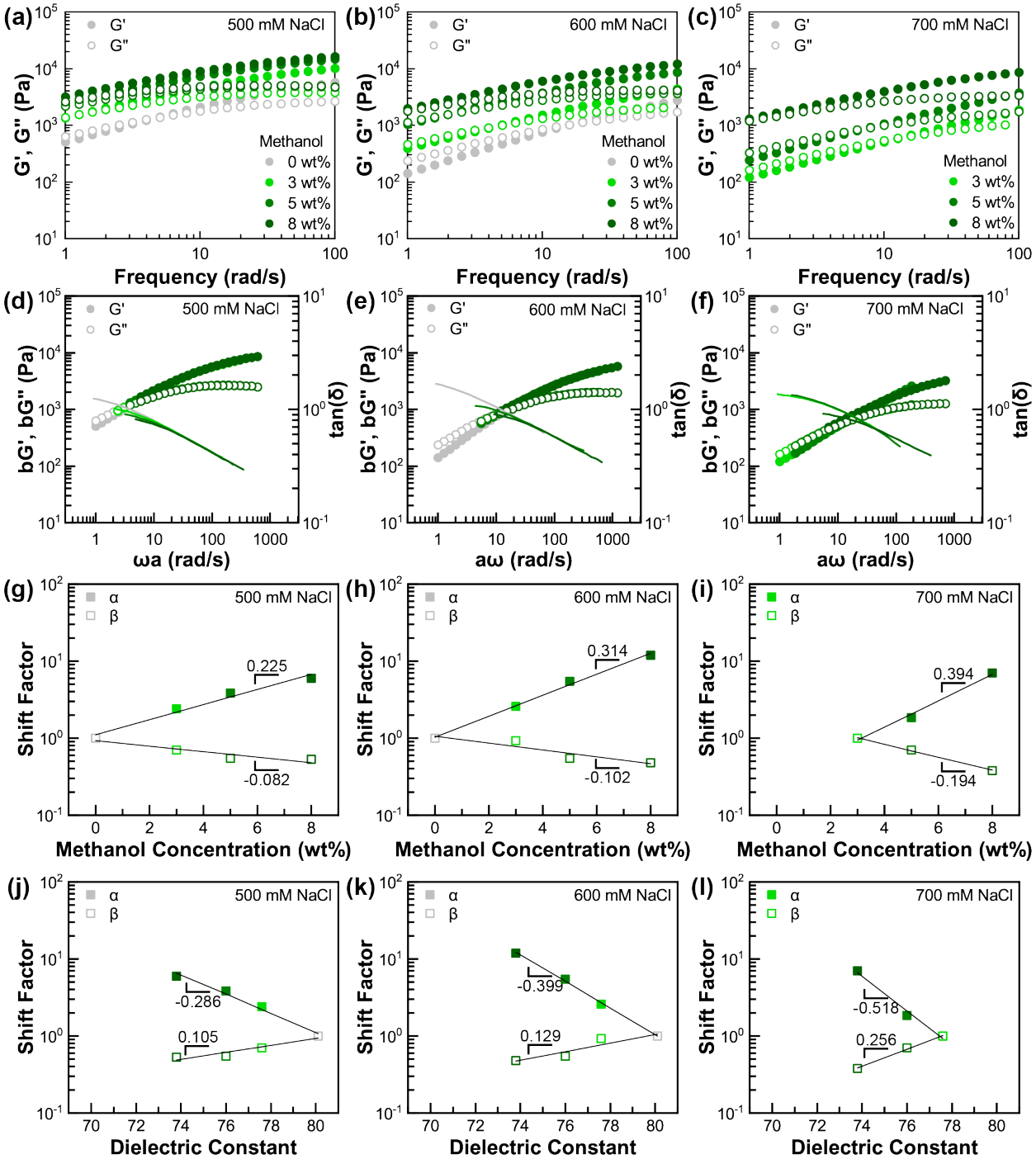

Figure S5. Frequency sweep data for coacervates formed at varying methanol concentrations in **(a)** 500, **(b)** 600, and **(c)** 700 mM NaCl, along with the corresponding **(d-f)** the corresponding time-methanol superposition plots and graphs of the horizontal and vertical shift factors as a function of **(g-i)** methanol concentration and **(j-l)** dielectric constant. 0 wt% methanol was used as the reference for the superposition for the 500 mM and 600 mM NaCl samples. 3 wt% methanol was used as the reference for the 700 mM NaCl sample. The exponential dependence of the shift factors as a function of methanol concentration is indicated as the slope of the linear fit on the semi-log plots.

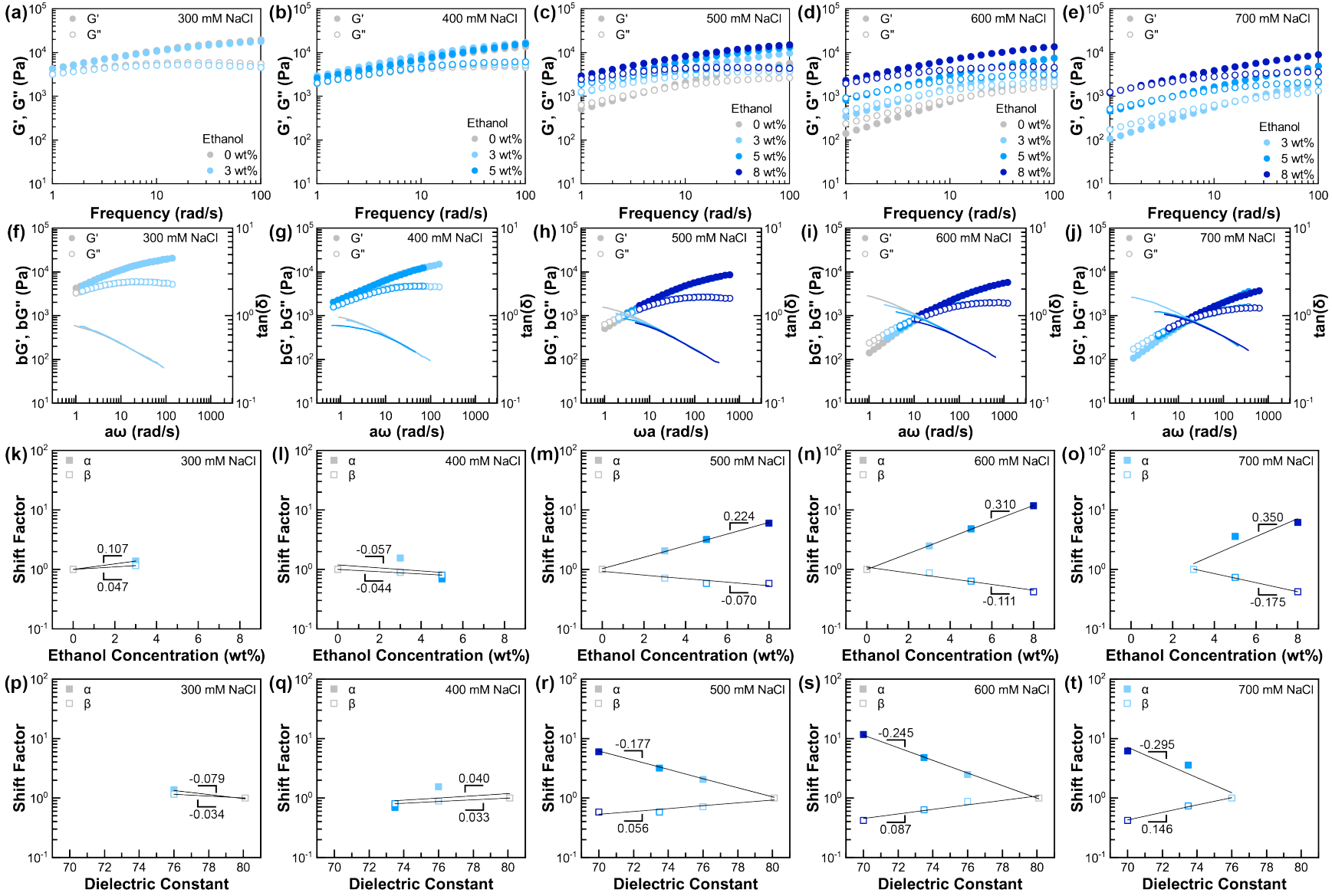

Figure S6. Frequency sweep data for coacervates formed at varying ethanol concentrations in **(a)** 300, **(b)** 400, **(c)** 500, **(d)** 600, and **(e)** 700 mM NaCl, along with the corresponding **(f-j)** the corresponding time-ethanol superposition plots and graphs of the horizontal and vertical shift factors as a function of **(k-o)** ethanol concentration and **(p-t)** dielectric constant. 0 wt% ethanol was used as the reference for the superposition for the 300 – 600 mM NaCl samples. 3 wt% ethanol was used as the reference for the 700 mM NaCl sample. The exponential dependence of the shift factors as a function of methanol concentration is indicated as the slope of the linear fit on the semi-log plots.

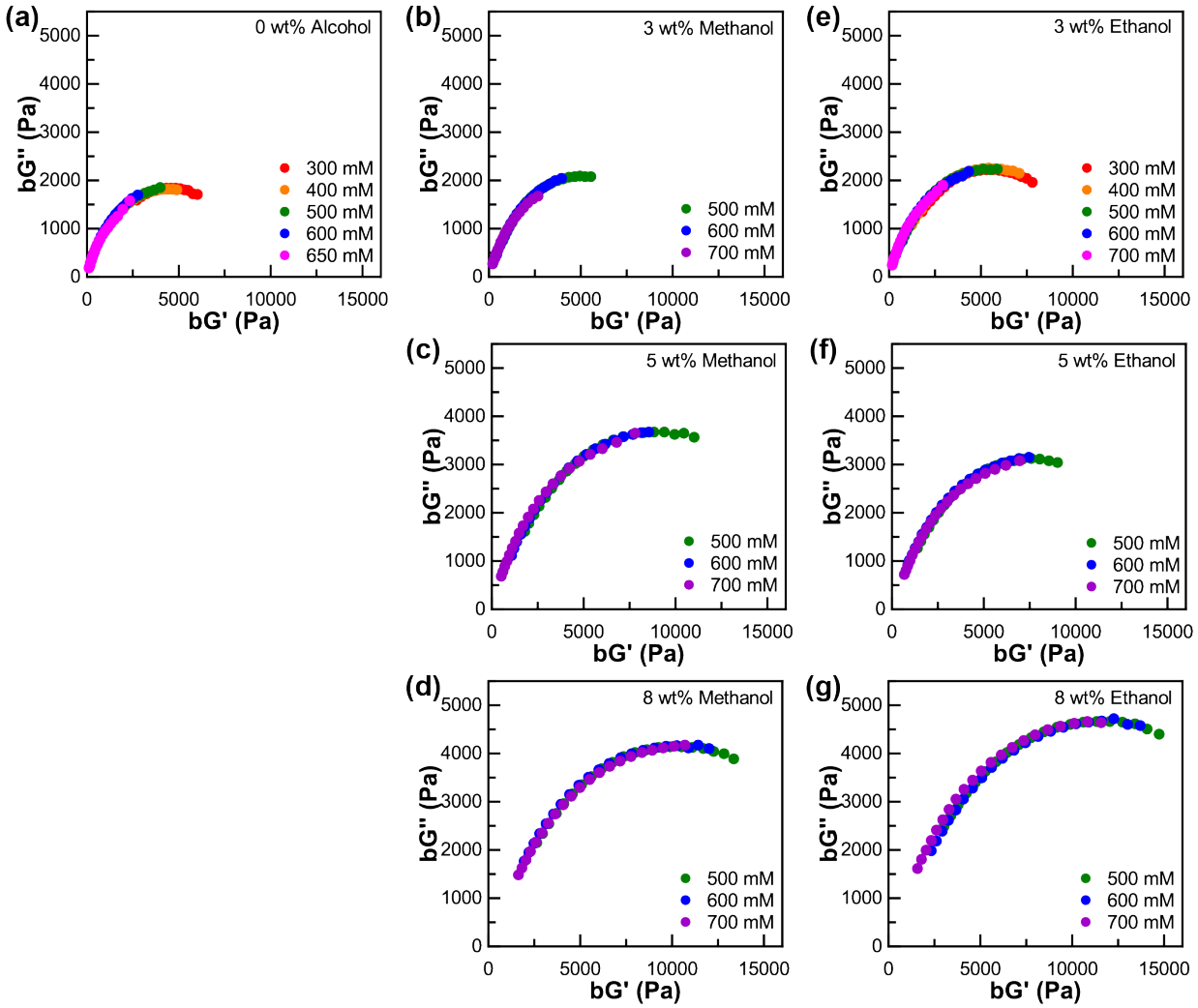

Figure S7. Cole-Cole plots (G" vs. G') related to the time-salt superposition of samples prepared **(a)** in water, **(b-d)** with various concentrations of added methanol, and **(e-g)** various concentrations of added ethanol.

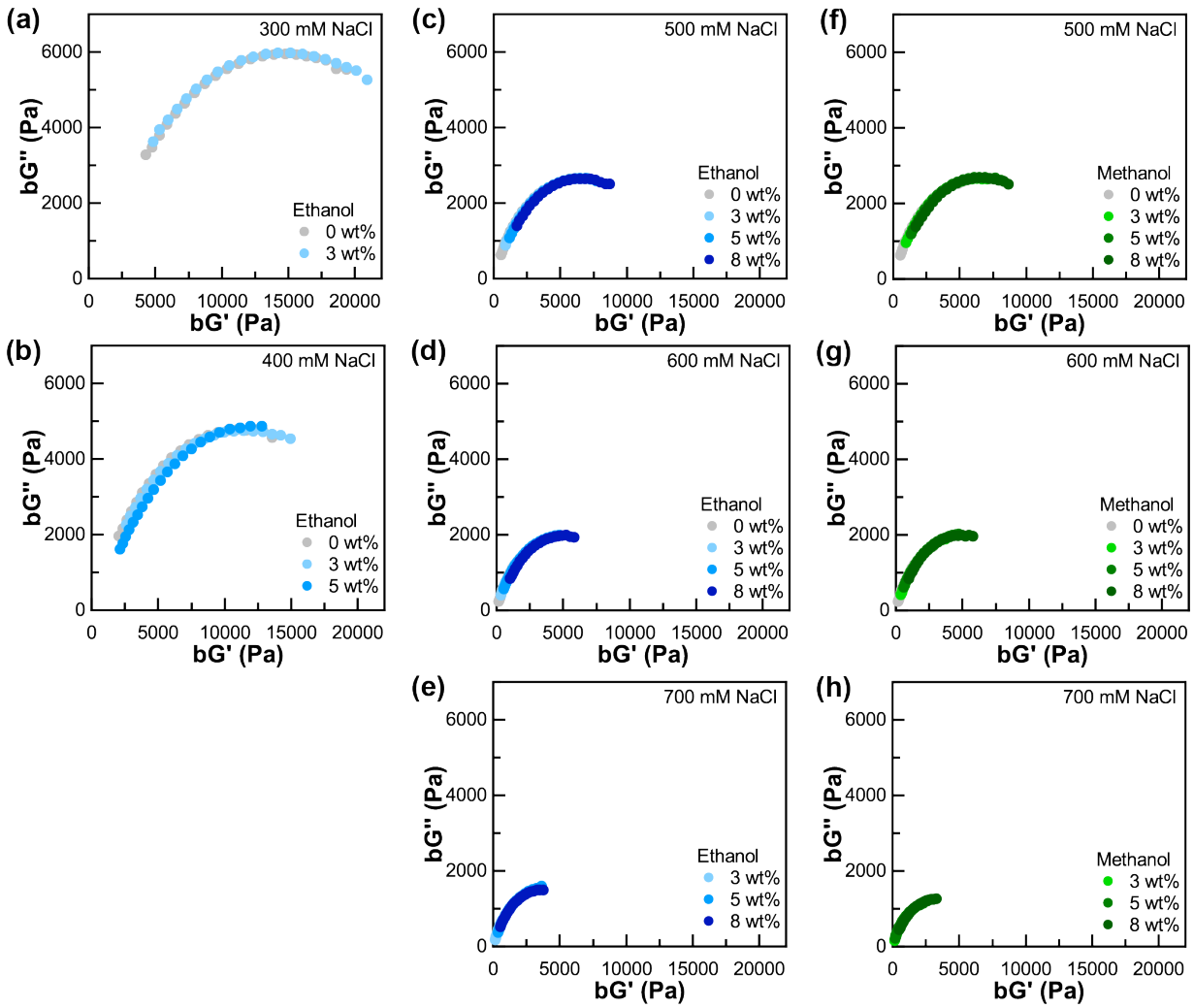

Figure S8. Cole-Cole plots (G" vs. G') related to the time-alcohol superposition of samples prepared **(a-e)** in with various concentrations of added ethanol, and **(f-h)** various concentrations of added methanol.

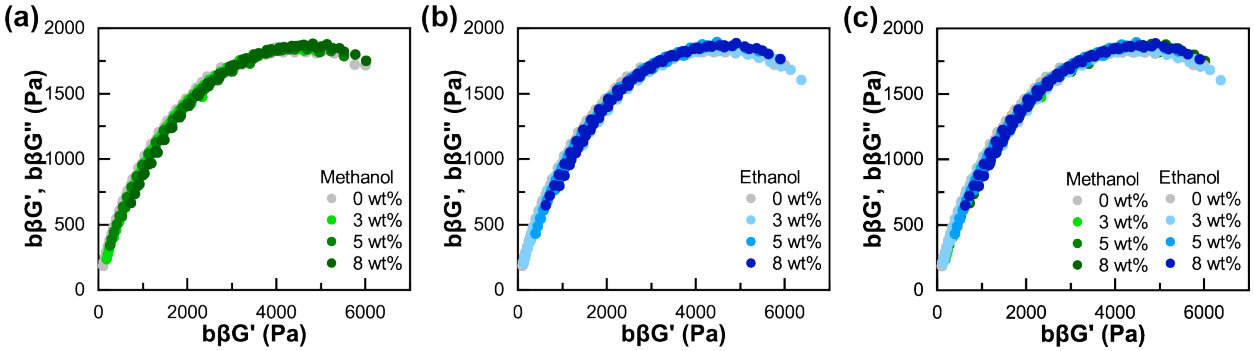

Figure S9. Cole-Cole plots (G" vs. G') related to the time-salt-alcohol superposition of samples prepared with various concentrations of added **(a)** methanol, **(b)** ethanol, and **(c)** the overlay of all samples.