

Macromolecular Regulators Have Matching Effects on the Phase Equilibrium and Interfacial Tension of Biomolecular Condensates

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Supplementary Material

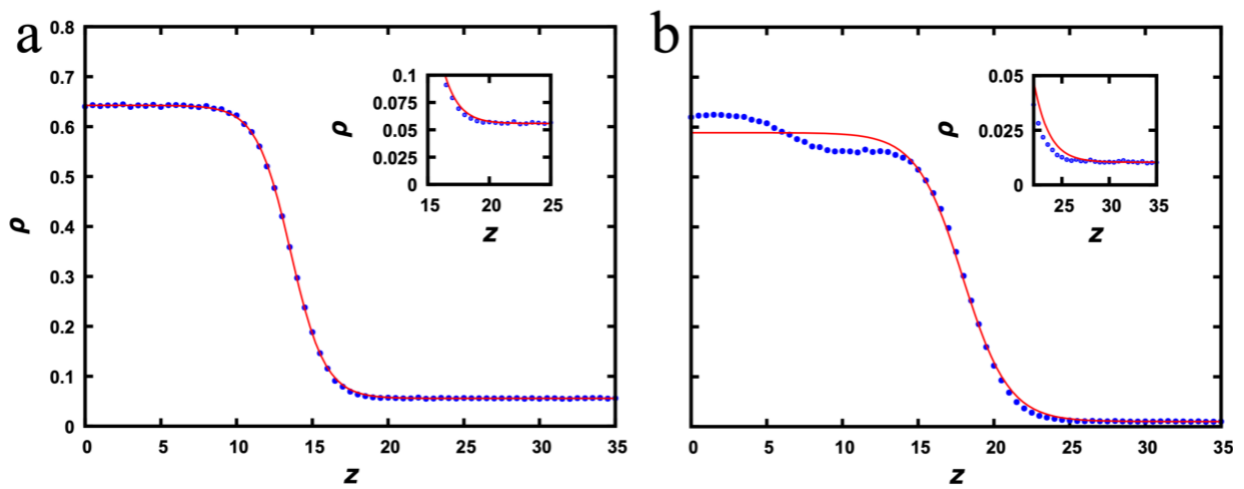


Figure S1. Fitting of density profiles to a hyperbolic tangent function. (a) Mixture of Lennard-Jones particles at $\epsilon_{\text{DR}} = 0.8$, $x_{\text{R}} = 0.6$, and $T = 0.87$. (b) Mixture of Lennard-Jones chains at $\epsilon_{\text{DR}} = 0.8$, $x_{\text{R}} = 0.6$, and $T = 2.0$. Insets display zoom into the low density region.

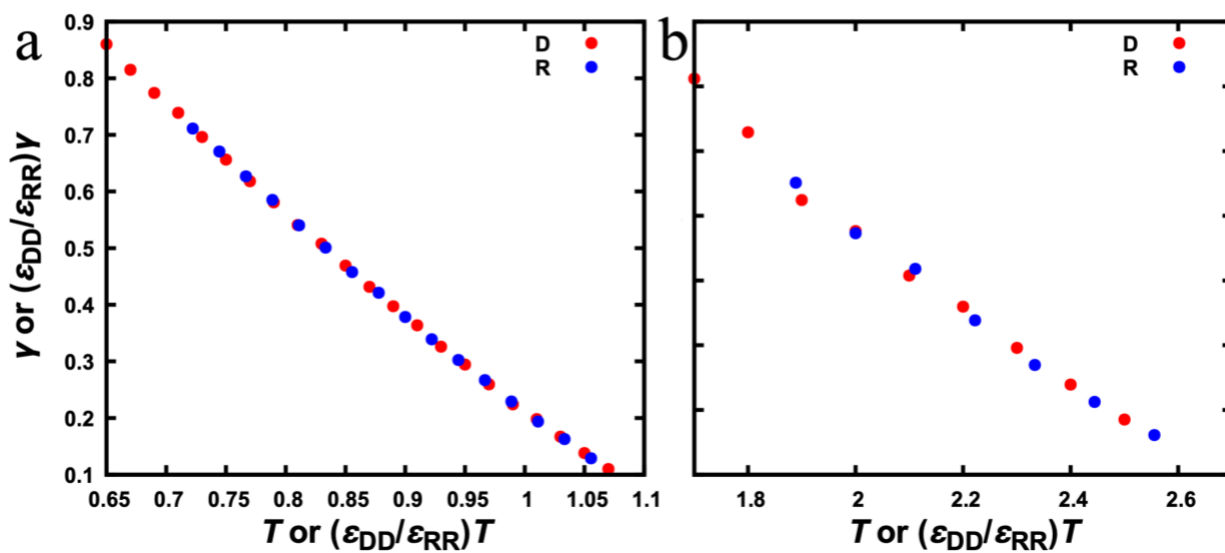
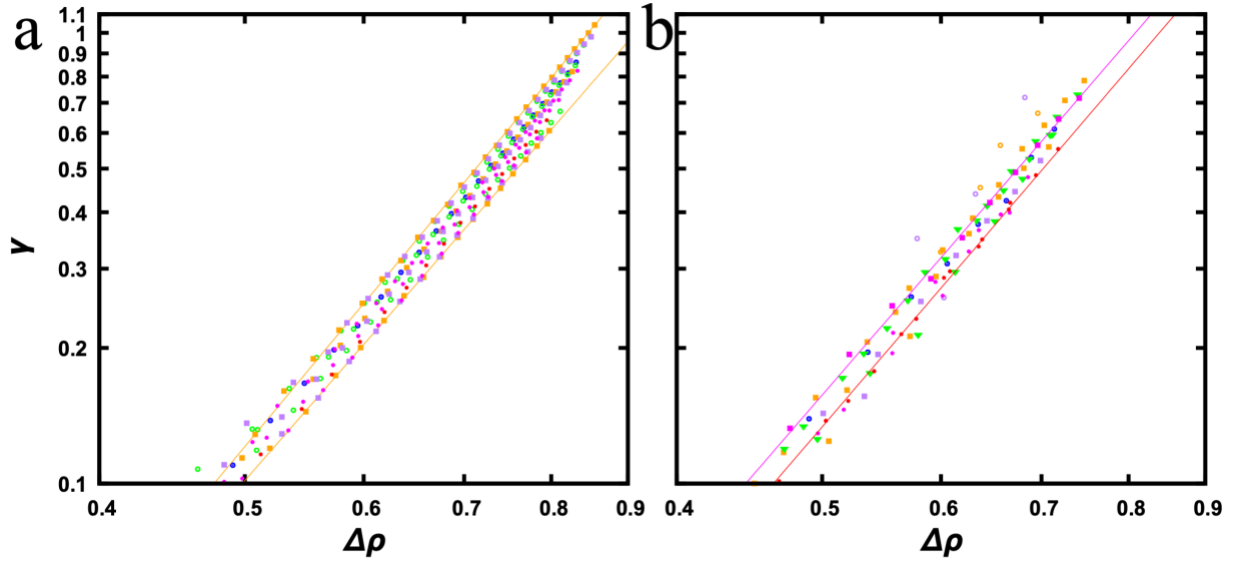


Figure S2. Comparison of interfacial tensions determined for the pure systems. (a) Pure particle systems. (b) Pure chain systems. The interfacial tensions and temperatures of the pure regulator systems are scaled by the factor $\epsilon_{DD}/\epsilon_{RR} = 1/0.9$.



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		Particles			Chains		
$x \backslash \varepsilon_{\text{DR}}$		0.8	1.0	1.2	0.8	1.0	1.2
	0	3.98			3.98		
	0.2	3.70	3.97	3.95	3.70	3.97	3.95
	0.4	3.81	3.97	3.99	3.81	3.97	3.99
	0.6	3.89	3.96	3.93	3.89	3.96	3.93
	0.8	3.93	3.93	3.83	3.93	3.93	3.83
	1	3.96			3.96		
		3.93 ± 0.07			3.93 ± 0.07		

Figure S3. Scaling relation between interfacial tension and density difference between dense and bulk phases. (a) Particle systems. (b) Chain systems. Anomalous γ values due to multiphase coexistence are shown as open symbols. (c) Exponents from fitting the dependence of γ on $\Delta\rho$ to eq [7].

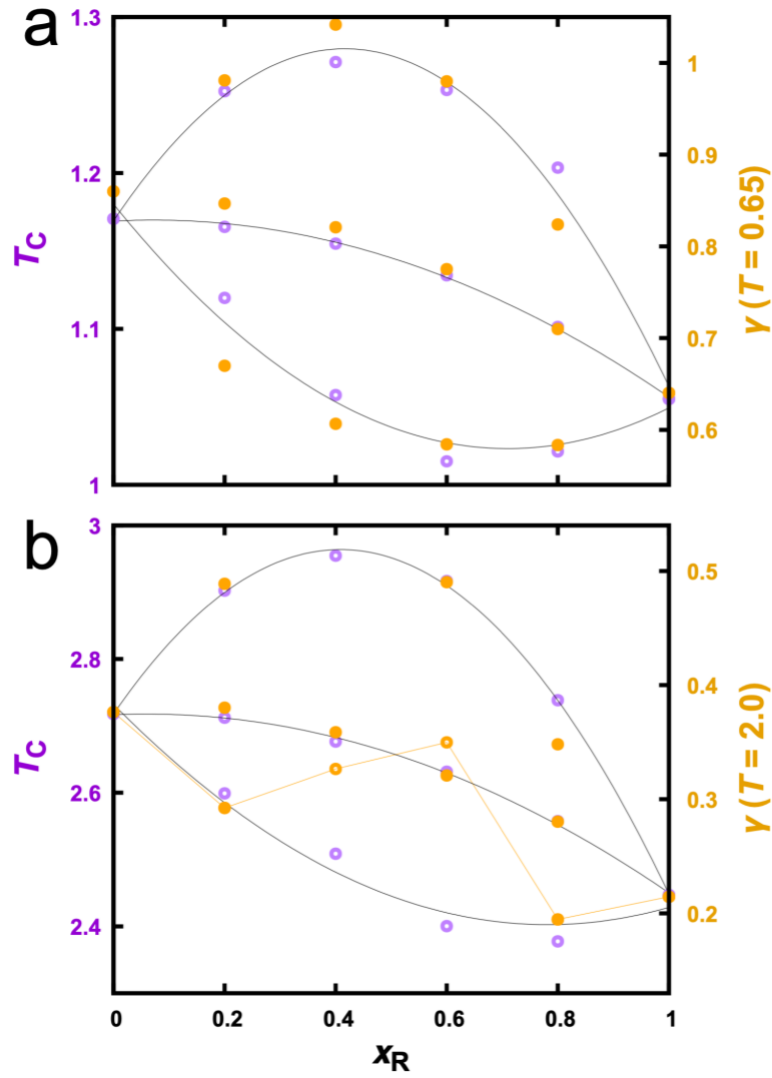


Figure S4. Regulatory effects on T_c and on γ . (a) Particle systems. (b) Chain systems. T_c values are determined by fitting binodals. Curves are parabolic fits to guide the eye. Data at $\epsilon_{DR} = 1.2, 1.0,$ and 0.8 are displayed from top to bottom in each panel. This figure is similar to Figure 4, except that the data for γ are at lower temperatures. Two anomalous γ values in panel (b) at $\epsilon_{DR} = 0.8$ are shown as open orange symbols.

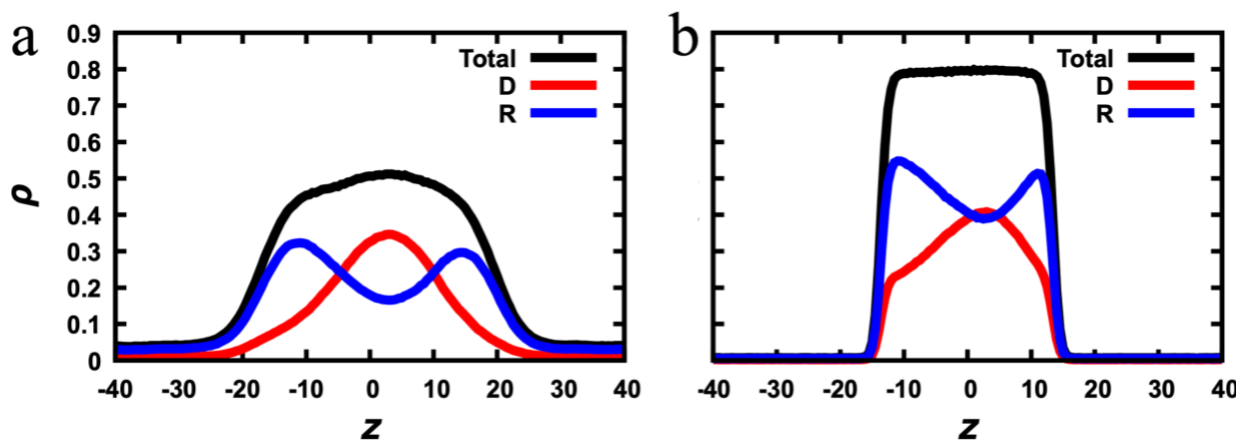


Figure S5. Regulator enrichment at the interface of dense and bulk phases. (a) Chain system at $\varepsilon_{DR} = 0.8$, $x_R = 0.6$, and $T = 2.2$. (b) Particle system at $\varepsilon_{DR} = 0.8$, $x_R = 0.6$, and $T = 0.65$. Note that, for the particle system, although the separate densities of the driver and regulator species are not uniform in the dense phase, the total density is very uniform.