Electronic Supplementary Information (ESI) for

Rheological properties and failure of alginate hydrogels with ionic and covalent crosslinks

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Figure S1 Schematic of gelation mechanism in ionic alginate gel.

Figure S2 The evolution of shear moduli during alginate gel formation. a) chemical alginate with [AAD] ≈ 10 mM and b) ionic alginate with [Ca$^{2+}$] ≈ 12.5 mM. The measurements were performed at strain amplitude $\gamma_0 = 0.1\%$ and $\omega = 1$ rad/s. The alginate concentration was 1% wt.
Figure S3 LAOS measurements on ionic alginate gels with different calcium $[\text{Ca}^{2+}]$ concentration.
Figure S4 Estimated Chebyshev coefficients (first $e_1$, and third, $e_3$) from stress-strain data during LAOS tests. $e_1$ is same as $G'_1$ presented Figure 4a. a $e_3$ and b $e_3/G'_1$ for chemical alginate gels with different AAD concentration. c $e_3/G'_1$ comparing ionic vs chemical alginate gels for crosslinker concentration of 12.5 mM.
Figure S5 Ellipsoid shape cavities formed during cavitation rheometry in ionic alginate gels with [Ca$^{2+}$] of a 12.5 mM, and b 15 mM.