Effect of ionic strength on shear-thinning nanoclay-polymer composite hydrogels

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Figure S1. Dynamic light scattering (DLS) and electrokinetic analyses of LAPONITE®-gelatin (LP-G) suspensions, yielding hydrodynamic size (a) and ζ-potential (b). At a constant gelatin concentration, increasing LAPONITE® concentration (e.g., 2% compared to 1%, Figure 1c), increases the hydrodynamic size of LAPONITE®-gelatin particles as a result of polymer-mediated nanoplatelet bridging. The stable size of particles suggests that the gelatin-stabilized LAPONITE® clusters form a stable colloidal suspension.
Figure S2. Images of LAPONITE®, gelatin, and different compositions of LAPONITE®-gelatin mixtures. (a-1) LAPONITE® (6 wt%) in Milli-Q water, (a-2) Gelatin (2 wt%) in Milli-Q water, (a-3) Gelatin (2 wt%) in PBS, (a-4) Gelatin (2 wt%) in DMEM. STBs prepared by mixing (b-1) LAPONITE® (6 wt%) in Milli-Q water and gelatin (2 wt%) in Milli-Q water, (b-2): LAPONITE® (6 wt%) in Milli-Q water and gelatin (2 wt%) in PBS, and (b-3) LAPONITE® (6 wt%) in Milli-Q water and gelatin (2 wt%) in DMEM. STBs prepared by mixing (c-1) LAPONITE® (12 wt%) in Milli-Q water and gelatin (6 wt%) in Milli-Q water (1:1), (c-2) LAPONITE® (12 wt%) in Milli-Q water and gelatin (6 wt%) in PBS, and (c-3) LAPONITE® (12 wt%) in Milli-Q water and gelatin (6 wt%) in DMEM.
Figure S3. Images of nanocomposites prepared by mixing (1:1 v/v) water-dispersed LAPONITE® (2 wt%) with gelatin (0.1 wt% in PBS or DMEM). The dispersions undergo phase separation.
Figure S4. Rheological properties of LAPONITE® dispersions/gels at $T = 37^\circ C$, prepared in Milli-Q water. Storage moduli (a), and loss moduli (b) versus angular frequency. Increasing LAPONITE® concentration increases the viscoelastic moduli. Effect of temperature and LAPONITE® concentration on the storage (at $\omega \sim 10$ rad s$^{-1}$, c) and loss (at $\omega \sim 10$ rad s$^{-1}$, d) moduli of LAPONITE® dispersions/gels.
Figure S5. Rheological properties of gelatin solutions at $T = 37^\circ C$, prepared in Milli-Q water, PBS, and media. Storage moduli (a), and loss moduli (b) versus angular frequency. Effect of temperature and media on the storage moduli (at $\omega \sim 10$ rad s$^{-1}$, c) and loss moduli (at $\omega \sim 10$ rad s$^{-1}$, d) of gelatin solutions.
Figure S6. Rheological properties of LAPONITE®-gelatin (1%) shear-thinning hydrogels prepared by mixing exfoliated LAPONITE® with gelatin dissolved in Milli-Q water, PBS, and DMEM at 25°C. Storage (a,c) and loss moduli (b,d) versus angular frequency.
Figure S7. Rheological properties of LAPONITE®-gelatin (3%) shear-thinning hydrogels prepared by mixing exfoliated LAPONITE® with gelatin dissolved in Milli-Q water, PBS, and DMEM at 25°C. Storage (a,c,e) and loss moduli (b,d,f) versus angular frequency.
**Figure S8.** Dynamics of injection force through the 5F catheter for LAPONITE® (a) and gelatin (b,c). The higher the LAPONITE® concentration, the higher the injection force, regardless of temperature. Gelatin, a heat-sensitive biopolymer, undergoes phase transition at room temperature, resulting in an increase in the injection force.
Movies showing the injection of LAPONITE®-gelatin STBs prepared in water (M1), PBS (M2), and DMEM (M3) through a 3 mL Luer lock syringe, equipped with a 23 G needle (BD Precision Glide 23G×1” thin wall M, with L = 38 mm and ID = 0.34 mm). Phase separation was observed in PBS and DMEM.