# A QCM-D Assay for Quantifying the Swelling, Biodegradation, and Protein Adsorption of Intelligent Nanogels

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## Supplemental Information

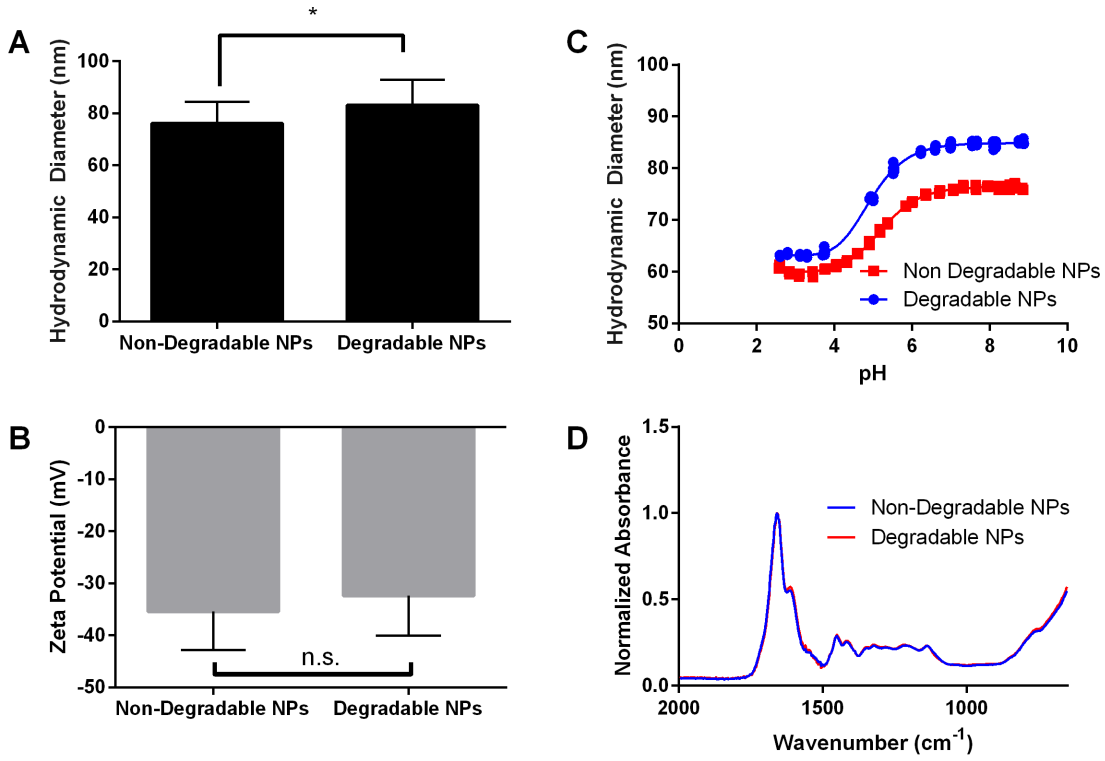


**Figure S1: Proof of Similarity for Degradable and Non-Degradable Nanogels. (a)** The degradable nanogels were slightly larger than the non-degradable analogues (1x PBS, pH = 7.4, nanogel concentration = 2 mg / mL, *$p < 0.05$, t-test). **(b)** There was no significant difference in nanogel zeta potential, indicating a similar density of carboxylic acid groups on the surface of degradable and non-degradable nanogels (5 mM sodium phosphate buffer, pH = 7.4, nanogel concentration = 2 mg / mL). **(c)** Both degradable and non-degradable nanogels exhibited a pH-responsive collapse as the pH was titrated below the $pK_a$ of the methacrylic acid moiety (pH ~ 4.8). This collapse was reversible in both cases. **(d)** The nanogels had indistinguishable FTIR absorbance spectra, indicating no differences in the nanogels' amide and carboxylic acid content. This suggested similar incorporation of the acrylamide and methacrylic acid monomers within the two formulations. Figure reproduced from Clegg *et al.* (22).

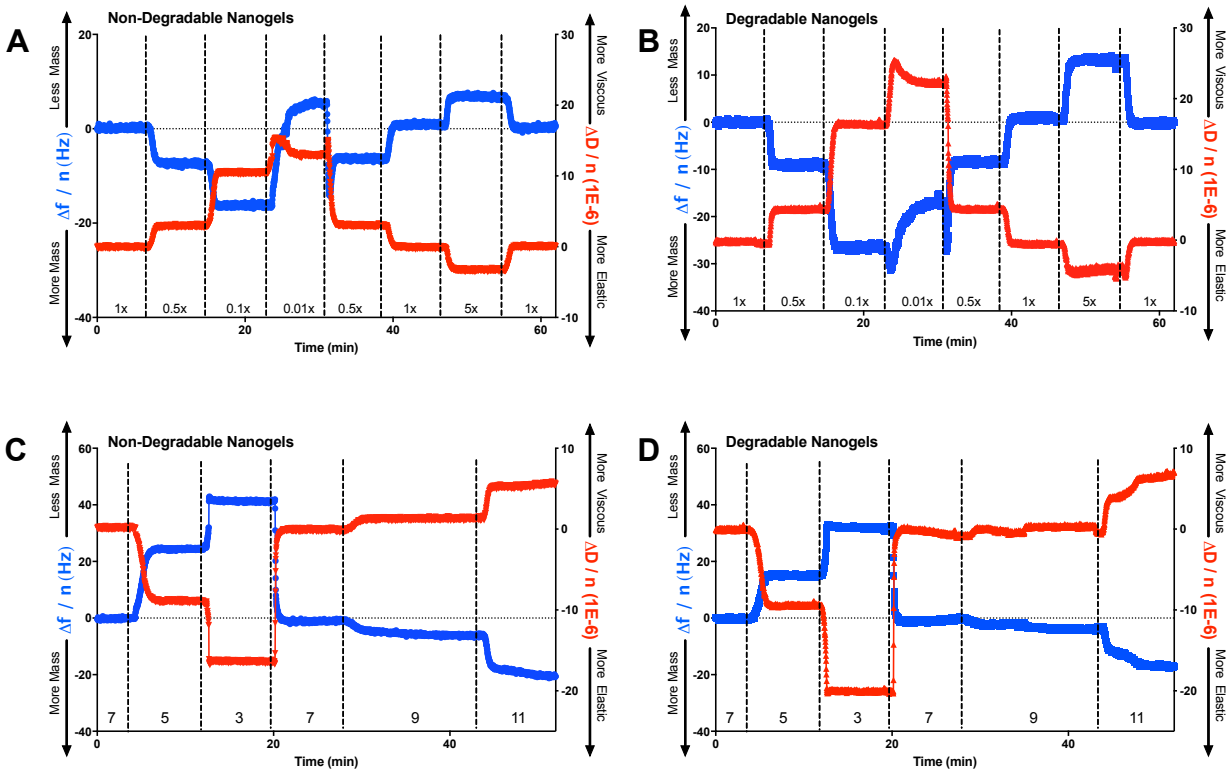


**Figure S2: Ionic strength and pH-responsive swelling of nanogels, as measured by QCM-D.** The frequency and dissipation measurements are given for: **(a)** non-degradable nanogels in response to ionic strength, **(b)** degradable nanogels in response to ionic strength, **(c)** non-degradable nanogels in response to pH, and **(d)** degradable nanogels in response to pH. All studies were conducted in phosphate buffered saline. Ionic strength values are given along the x axis as a dilution of PBS (1x = 0.162 M), and the pH was held constant at 7.4 (**a-b**). The solution pH values are given along the x axis, where each buffer was adjusted from 1x PBS (pH = 7.4) with 1 N NaOH or HCl. (**c-d**). No significant differences were observed in the ionic strength or pH-responsiveness of non-degradable versus degradable nanogels.

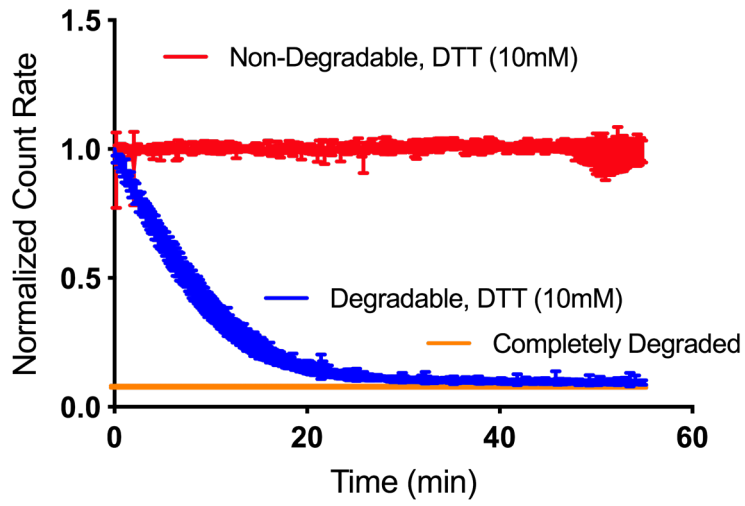


**Figure S3: Nanogel biodegradation measured by DLS.** Non-degradable nanogels were unaffected by incubation in 10 mM DTT, whereas degradable nanogels decomposed rapidly via competition of DTT with the disulfide crosslinks. The degradable nanogels degraded to 50% of their initial quantity, as estimated by count rate, within 6.75 min, and degraded completely in 30 min. We concluded that degradation was complete when the nanogels were indistinguishable from a linear co-polymer of the same composition. (10 mg/mL nanogels in 1x PBS, pH = 7.4, T = 37 ˚C). Figure adapted from Clegg *et al.* (22).