SUPPORTING INFORMATION AVAILABLE

Characterization of Alginate Modification

Acrylation was validated via proton NMR, using a similar analysis to that performed by Jeon. [33] The vinyl protons marked 'b' in Figure SI1 indicate the acrylation of the alginate polymer backbone.

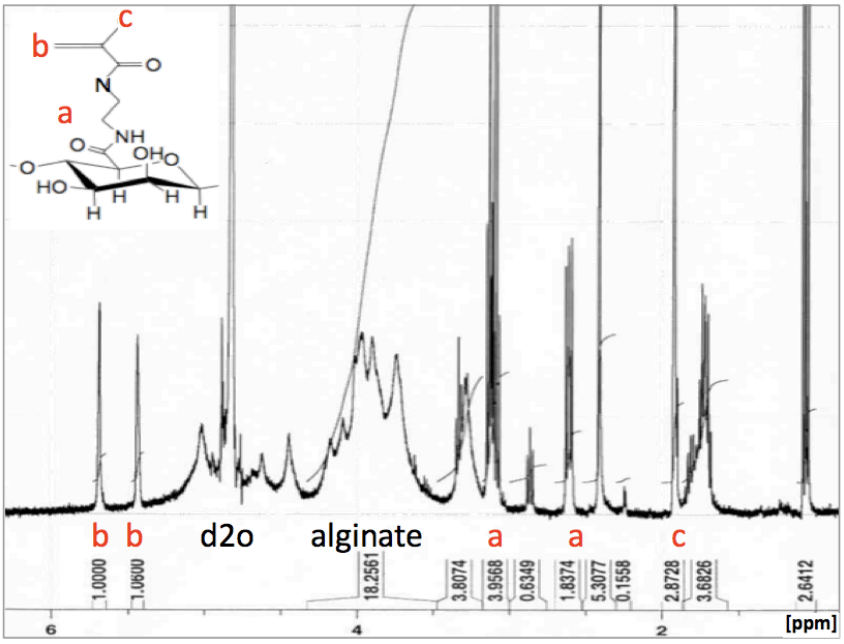

Figure SI1. Proton NMR analysis of methacrylated alginate.

Biotinylation was measured using a modified HABA assay (Pierce 28005). Alginate was degraded using alginate lyase (1 mg/ mL) for one hour before proceeding. This degradation enabled standardization and reproducibility of the assay; samples assayed without degradation formed visible aggregates in the wells. The degraded samples were assayed according to manufacturer's instructions. Figure SI2 shows the correlation between theoretical modification (as a % of carboxyl groups on the alginate backbone potentially derivitized if the reaction went to completion) and resulting biotinylation as measured using the HABA assay. At 10% theoretical modification, the measured modification is 5.24%, representing a 52.4% reaction efficiency.

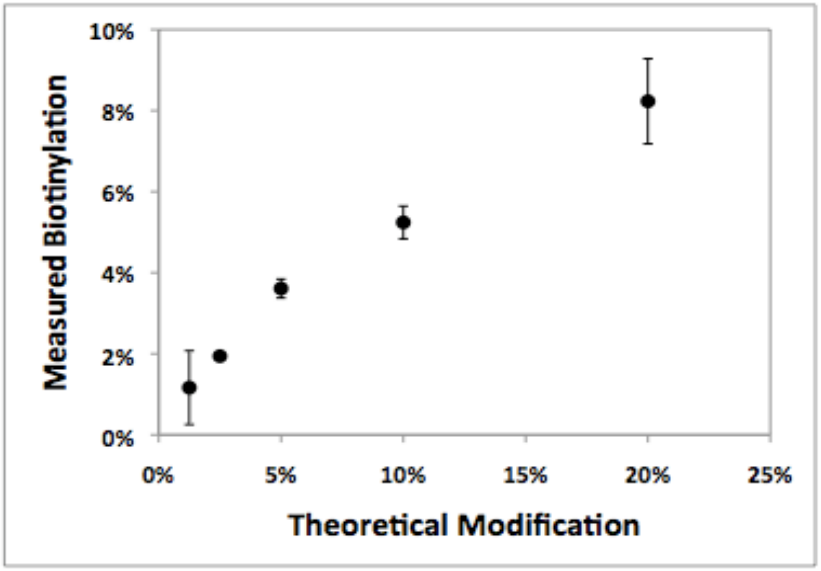

Figure SI2. HABA analysis of biotinylation as a function of theoretical modification.

Equilibrium Swelling of Hydrogels

Macroscale hydrogels were formed by photocrosslinking 200uL of 2% alginate solutions with a range of methacryl substitution (25-75%). As demonstrated in Figure SI3, solutions with 25-35% theoretical derivitization did not fully photocrosslink and did not form stable gels. The equilibrium swelling ratio was measured for gels formed with alginates with 45-75% acryl substitution by measuring the weight of the gel after crosslinking, and after immersion in PBS for 24 hours, similar to approaches used by others. [34] As expected, gels with lower crosslinking had higher swelling ratios. [35]

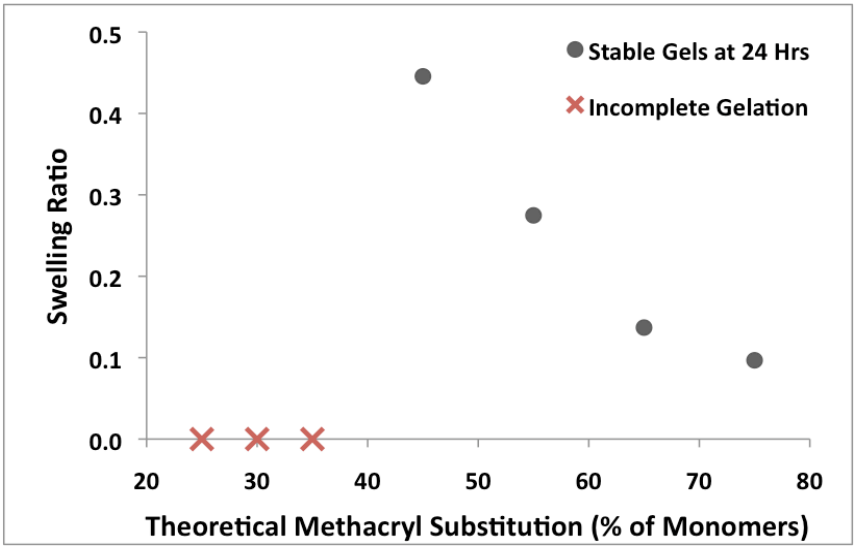

Figure SI3. Swelling Ratio of alginate gels formed with various degrees of methacrylation.