

Multifunctional lipid-coated polymer nanogels crosslinked by photo-triggered Michael-type addition

Supporting information

Yingkai Liang,¹ Kristi L. Kiick^{1,2,3}

¹Department of Materials Science and Engineering, 201 DuPont Hall, University of Delaware, Newark, DE 19716, USA

²Biomedical Engineering, University of Delaware, Newark, DE 19716, USA

³Delaware Biotechnology Institute, 15 Innovation Way, Newark, DE 19711, USA

1. Synthesis of photolabile, protected PEG-SH

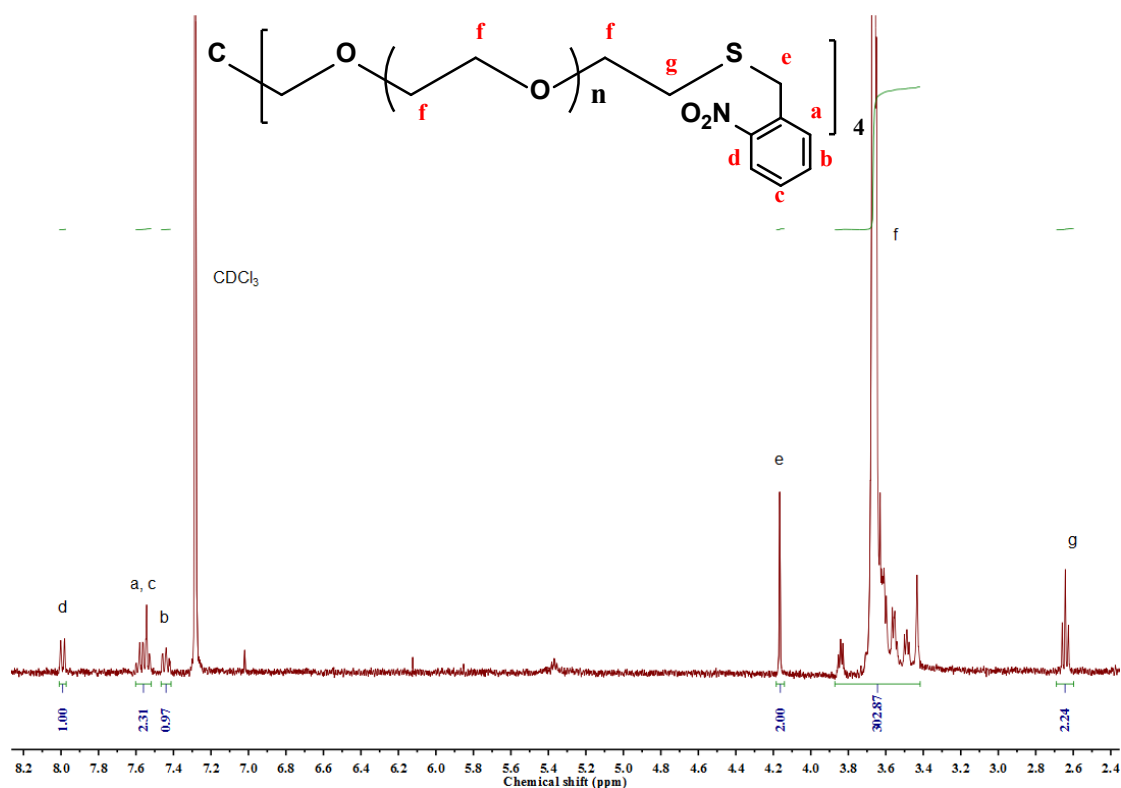


Fig. S1 ¹H NMR spectrum of four-arm thiolated PEG protected with the nitrobenzyl group. Functionality is calculated based on the integration of the aromatic protons of the protecting group relative to the methylene protons of the polymer.

2. Bulk gel preparation via photo-triggered Michael-type addition

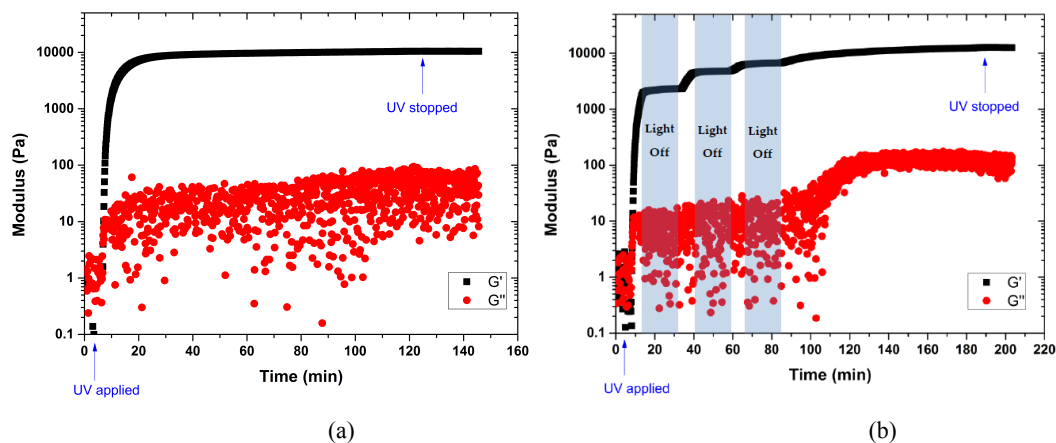


Fig. S2 Oscillatory rheology time sweeps of 15wt% PEG hydrogels formed by photo-triggered Michael-type addition with (a) continuous and (b) periodic irradiation (365nm and 10mW/cm²). (Plotted in log scale)

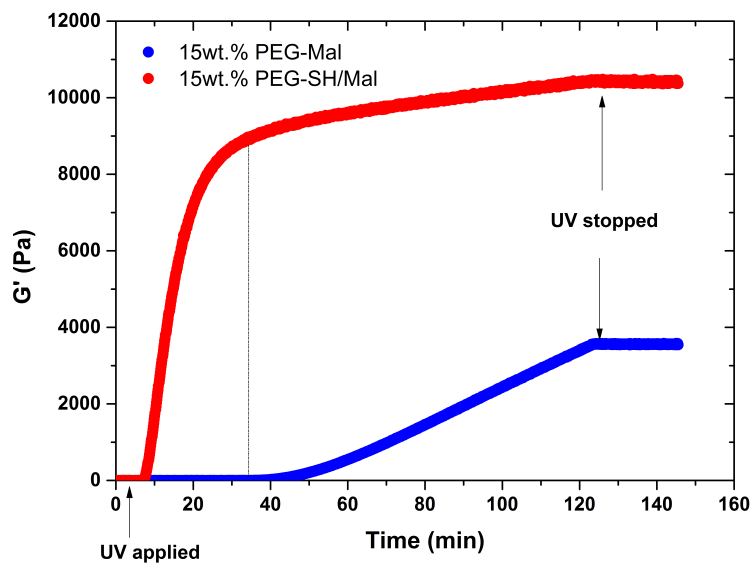


Fig. S3 Storage moduli of 15wt% PEG-SH/Mal hydrogels and a 15wt% PEG-Mal control, irradiated at 365nm, 10 mW/cm² in aqueous solution, characterized via oscillatory rheology.

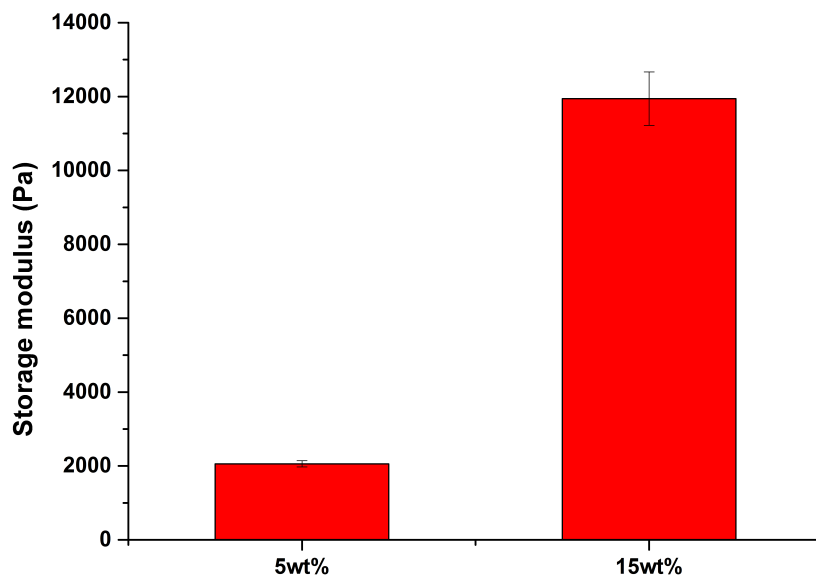


Fig. S4 Comparison of storage moduli of PEG-SH/Mal hydrogels at different concentrations, after irradiation at 365nm, 10 mW/cm² in aqueous solution, characterized via oscillatory rheology.

3. Stability of lipid-coated nanogels (NGs)

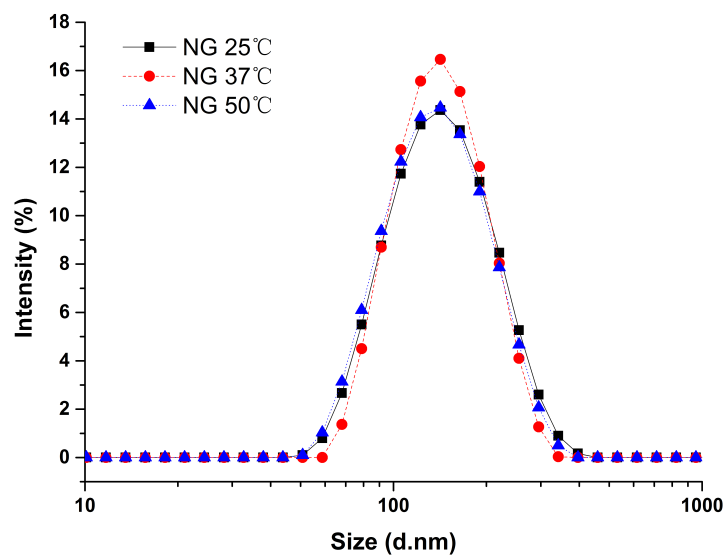


Fig. S5 Dynamic light scattering analysis of the hydrodynamic size of lipid-coated nanogels in PBS at different temperatures.

4. Surface functionalization of lipid-coated nanogels

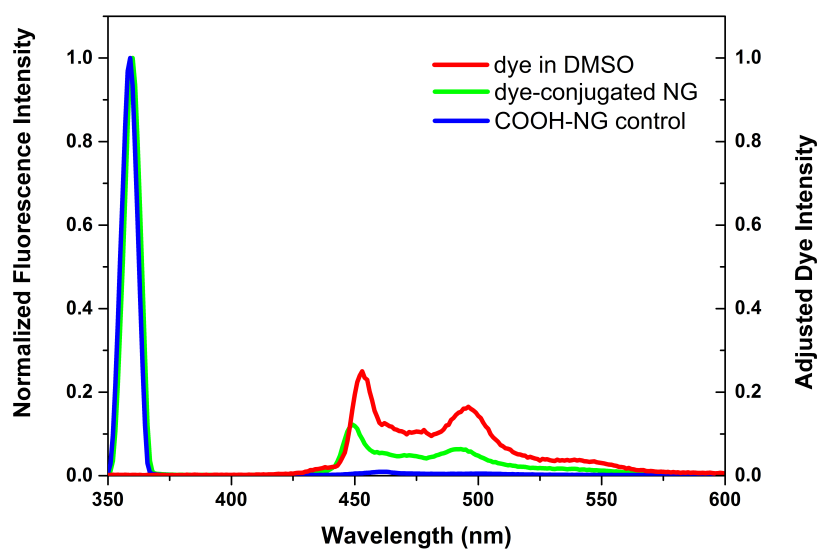


Fig. S6 Emission fluorescence spectra of carboxylic-acid lipid-coated nanogels and dye-conjugated nanogels in aqueous solution ($\lambda_{exc}=333\text{nm}$, 20°C); spectra of nanogels were normalized to the o-nitrosobenzaldehyde peak at 360nm, which should be of similar intensity for the various nanogels.

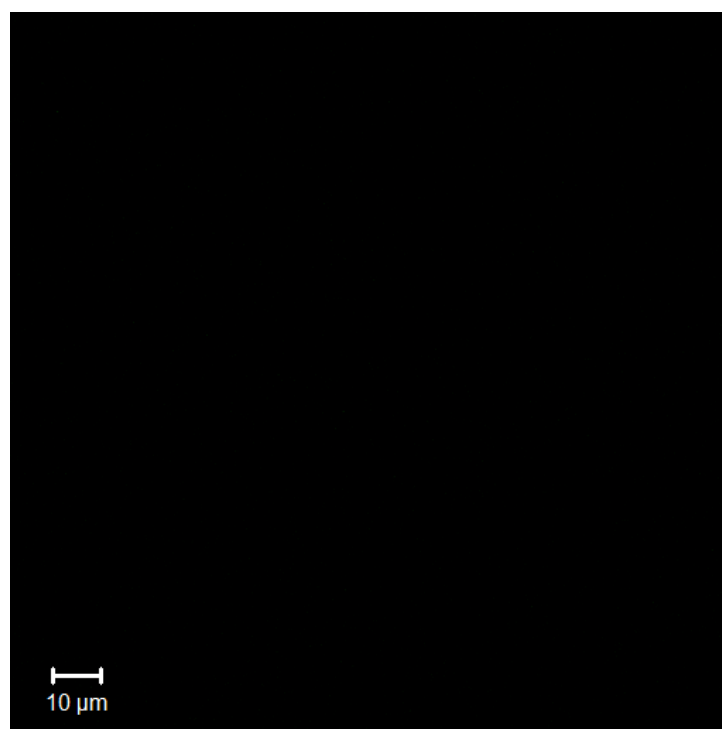


Fig. S7 Fluorescence microscopy image of COOH-NG control in aqueous solution, characterized via confocal laser scanning microscopy (CLSM).