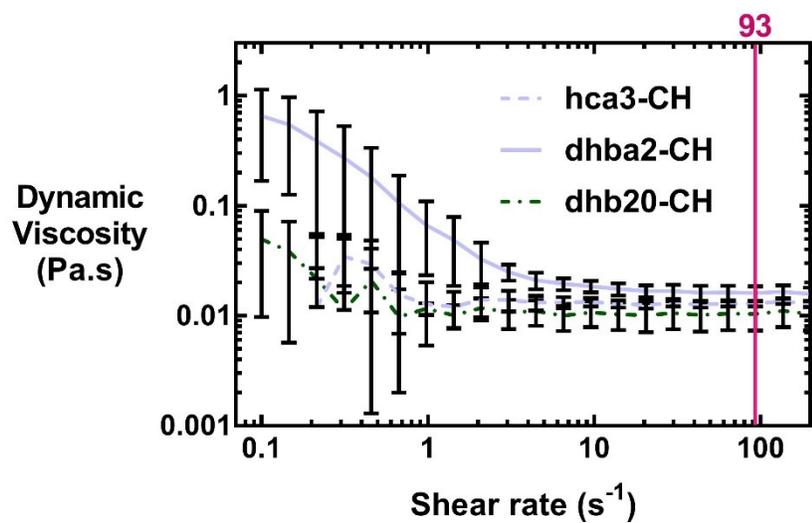
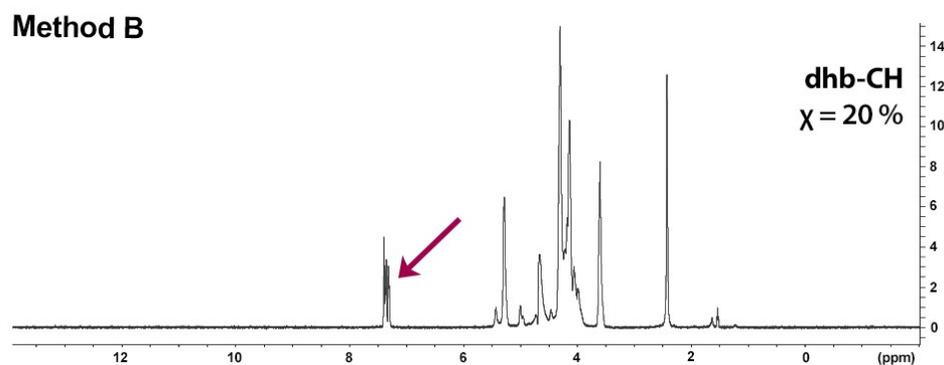
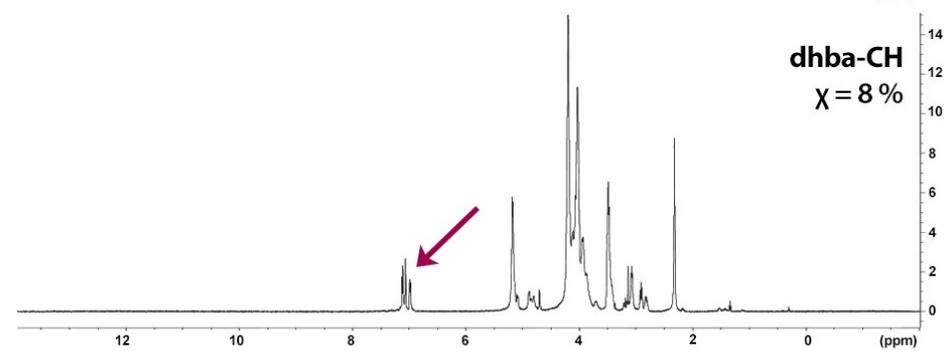
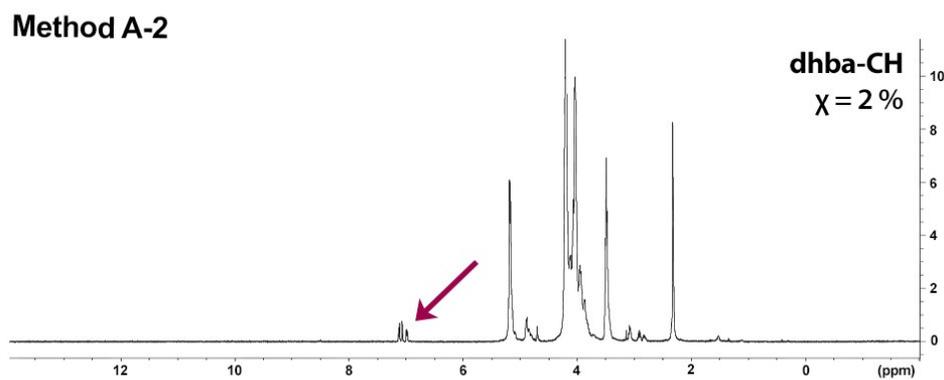
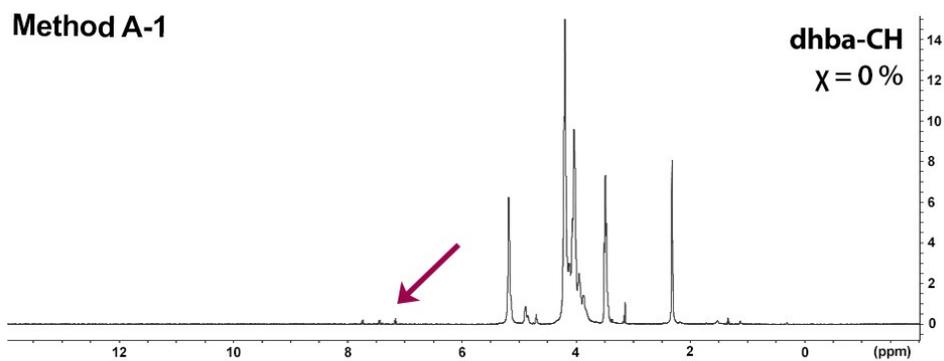


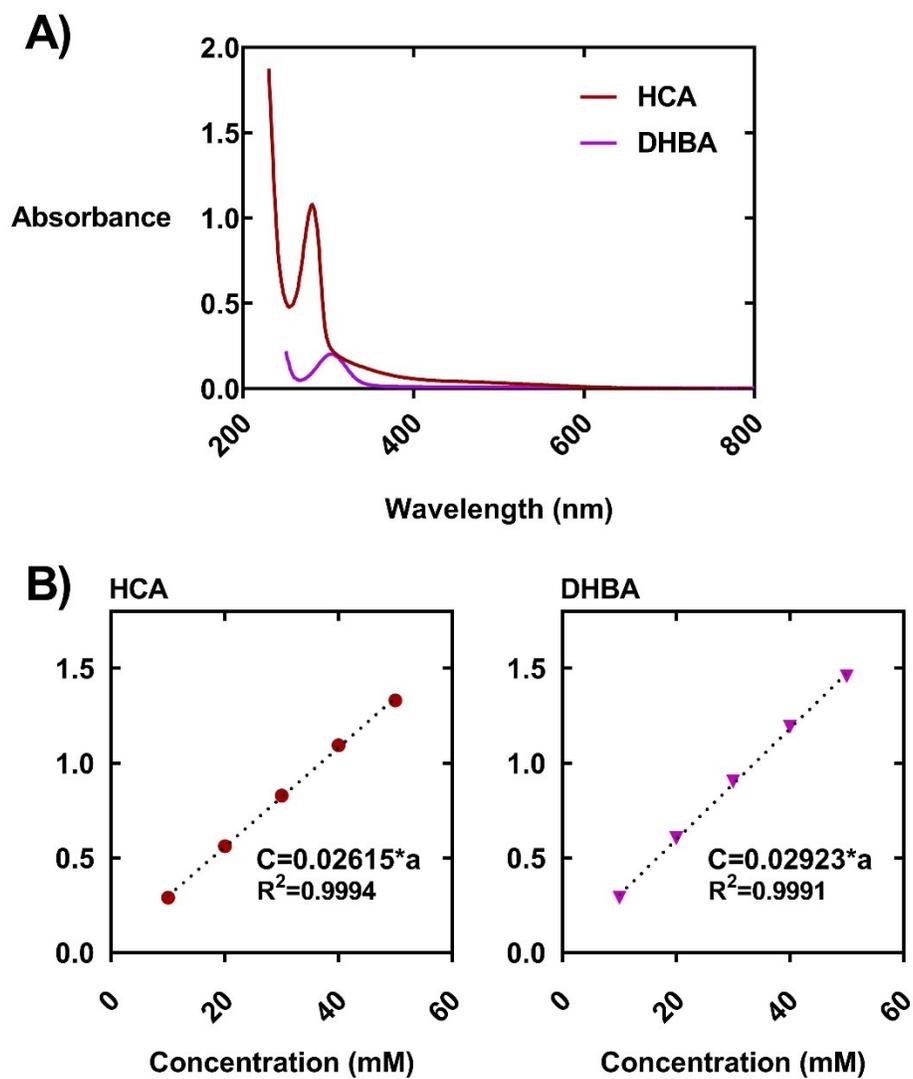
Supporting Information



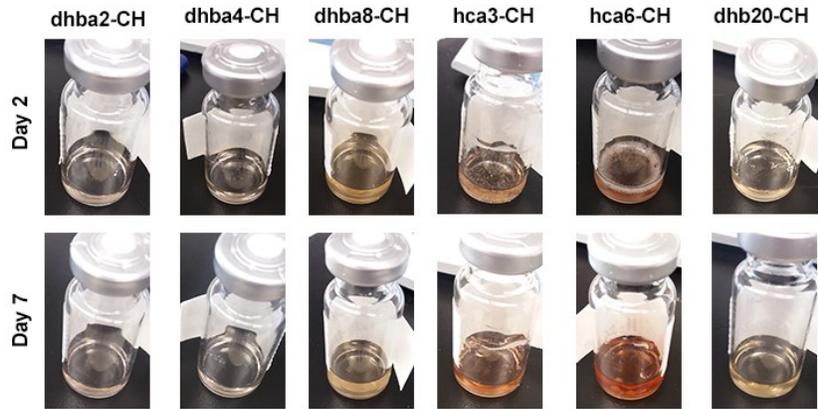
Supp. Fig. 1: Frequency sweeps of different cat-CH (1% w/v) in 0.1M HCl. The working frequency of 93 s⁻¹ falls into the range where viscosity is independent of shear rate.



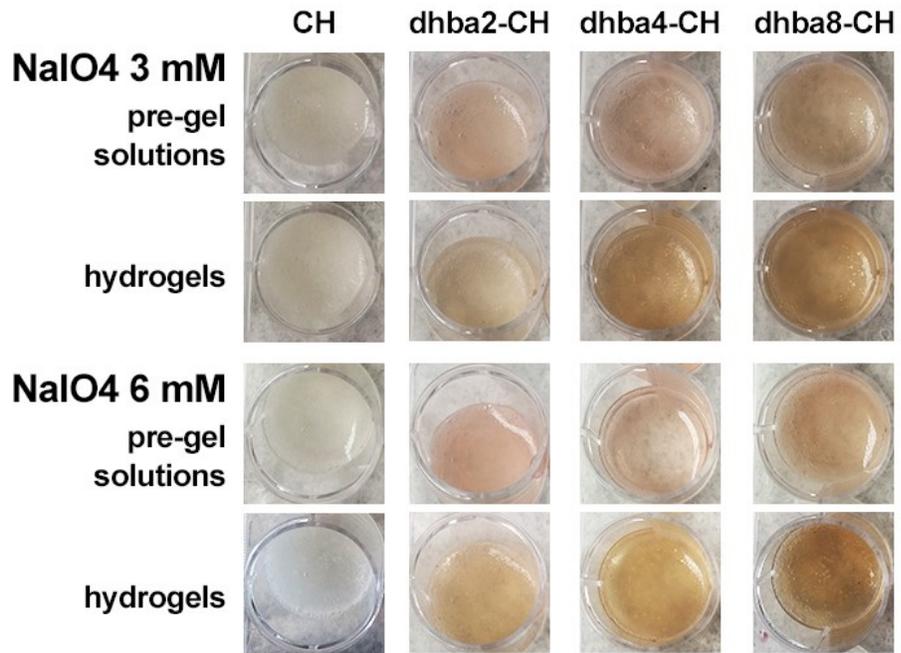
Supp. Fig. 2: Representative NMR¹H spectra for different cat-CH and different grafting methods (Method A: carbodiimide coupling with EDC, Method B: reductive amination). The peaks relative the cat group (6.5-6.7 ppm) are indicated by a red arrow.



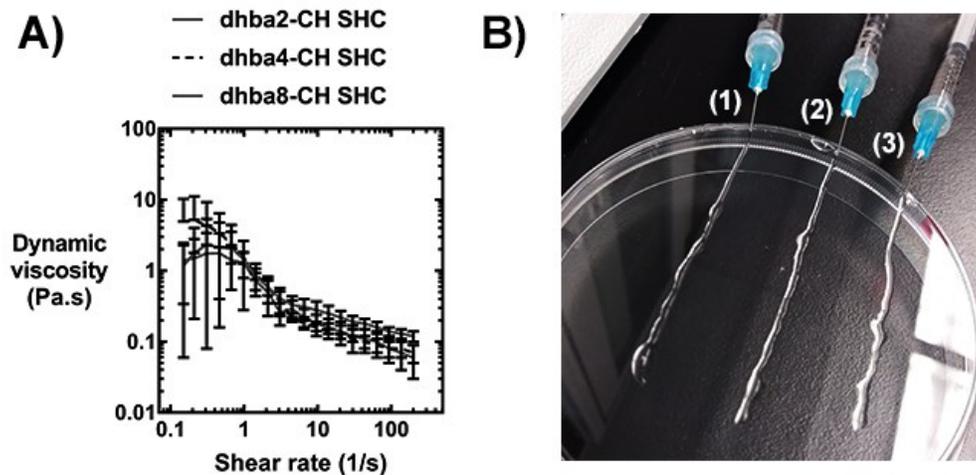
Supp. Fig. 3: UV-Visible analysis of cat-CH. A) Spectra of hca-CH and dhba-CH. The polymers have a maximum of absorption at 280 nm and 307 nm respectively. B) Calibration curves obtained for HCA and DHBA at the wavelengths corresponding to maximum absorbance.



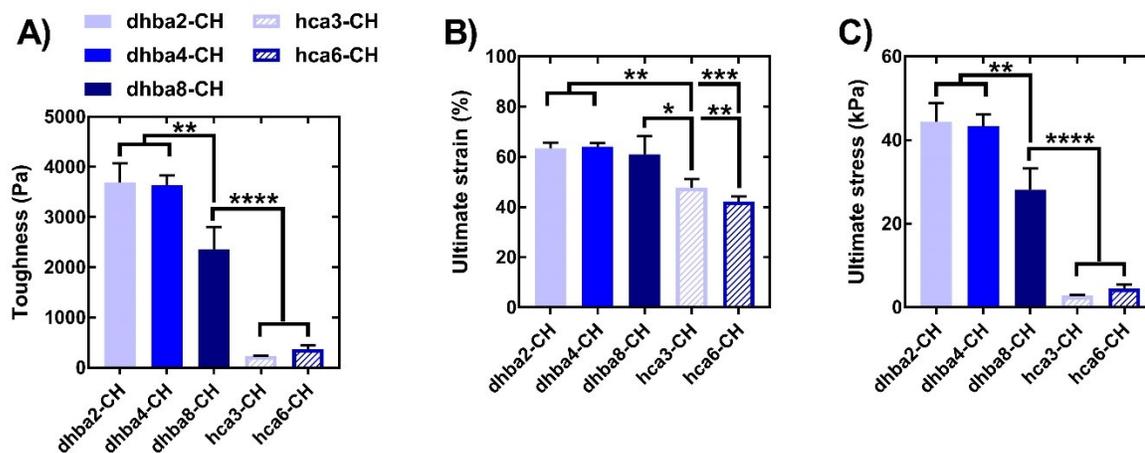
Supp. Fig. 4: Digital pictures showing changes in colour after 2 and 7 days for different cat-CH solutions.



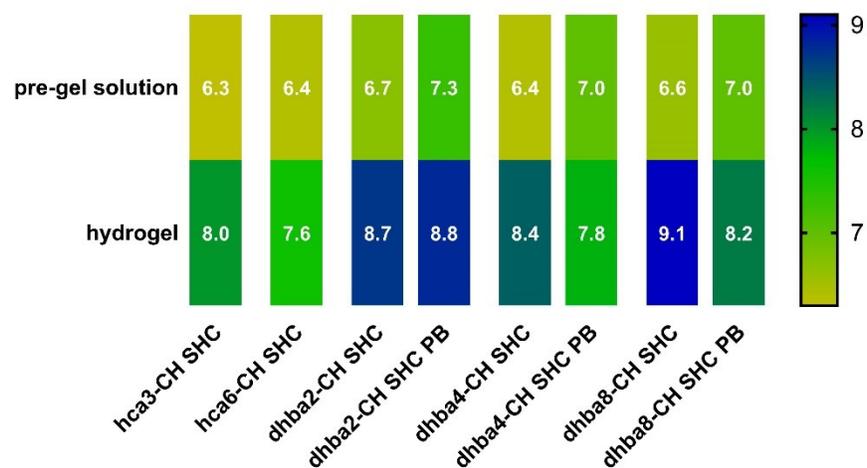
Supp. Fig. 5: Oxidation of dhba-CH hydrogels ($\chi = 2, 4$ and 8%) with two different concentrations of NaIO₄, an oxidizing agent that triggers quick oxidation. The extent of oxidation is deducible from the intensity of the orange and increases with cat content (χ).



Supp. Fig. 6: A) Viscosity of dhba-CH with $\chi = 2\%$, 4% and 8%. All formulations are shear-shinning. B) Extrusion of dhba-CH/SHC pre-gel solutions through 25G needles at 22 °C. (1) dhba2-CH, (2) dhba4-CH, (3) dhba8-CH.



Supp. Fig. 7 : A) Toughness (Pa) of dhba-CH and hca-CH hydrogels calculated by integrating the stress-strain compression curve from 0 to breakage. B) Ultimate stress and C) ultimate strain of hca-CH and dhba-CH hydrogels obtained from stress/strain compression data.



Supp. Fig. 8: pH of the cat-CH/SHC hydrogels with and without PB. Measures were taken on the pre-gel solutions (right after mixing) and after 24 h of gelation. The pH of the GA was the following: 8.6 (SHC); 8.2 (SHC PB)