Elaboration and rheological characterization of nanocomposite hydrogels containing C_{60} fullerene nanoplatelets

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SUPPORTING INFORMATION.

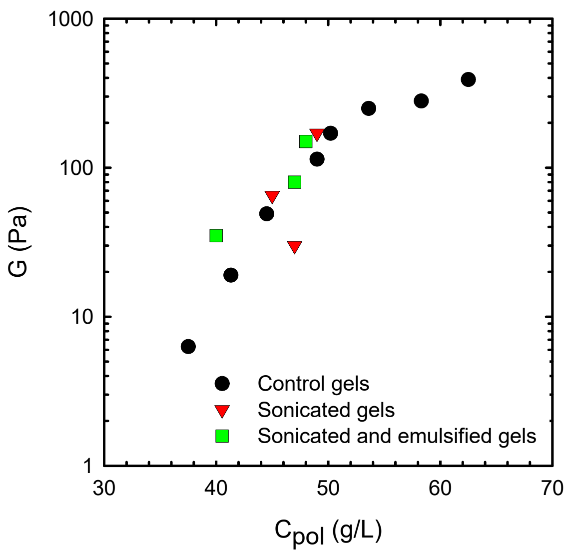

Figure S1. Shear modulus measured at T=20°C, ω=10 rad/s and γ=1% for neat 75C12 hydrogels (black circles), gels sonicated during 8 minutes (red triangles) and gels sonicated during 8 minutes in the presence of 40 vol% carbon disulfide, that eventually completely evaporated (green squares).

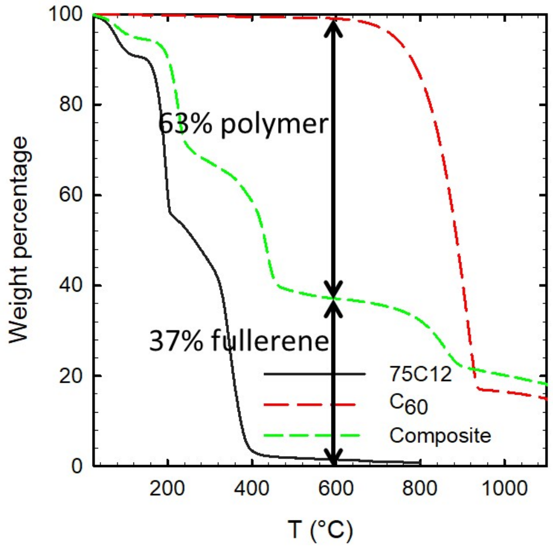

Figure S2. TGA thermogram obtained on freeze-dried powders for 75C12, C_{60} and their composite with 63% polymer and 37% fullerene.

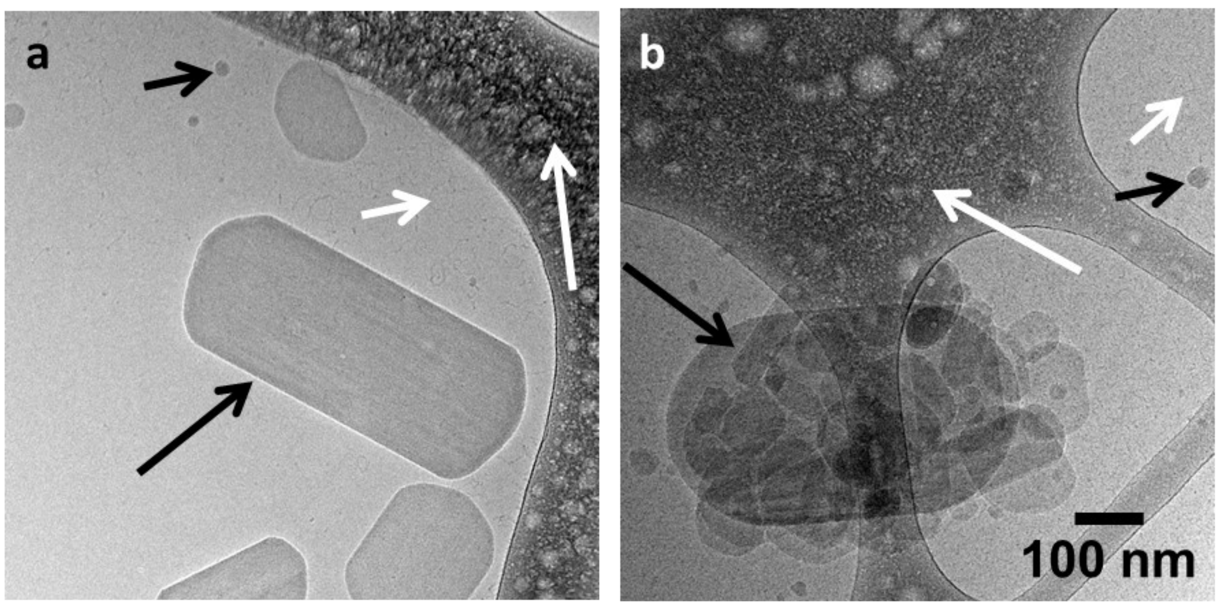

Figure S3. Enlarged representative cryo-TEM pictures of C_{60} nanoplatelets dispersion in water before (a) and after redispersion following their freeze drying (b). Short white arrows show micelles (spherical + worm-like) formed by self-assembly of 75C12; long white arrows show the carbon-lacey supporting membrane; long black arrows show fullerene nanoplatelets; short black arrows show isotropic fullerene nanoparticles.

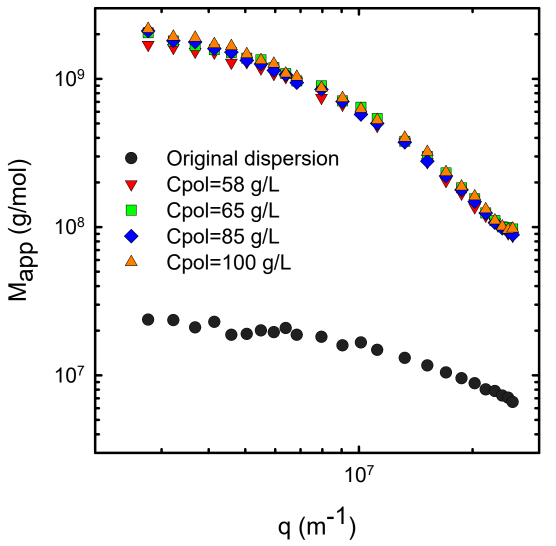

Figure S4. Apparent mass-weighted molar mass obtained by SLS for a dispersion of C_{60} nanoplatelets (black circles) and their re-dispersions in water at different concentrations as indicated in legend.

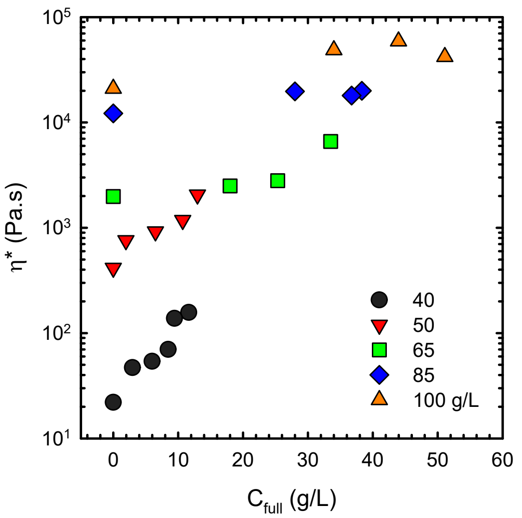

Figure S5. Evolution of complex viscosity upon fullerene concentration for hydrogels with various polymer concentrations as indicated in legend.

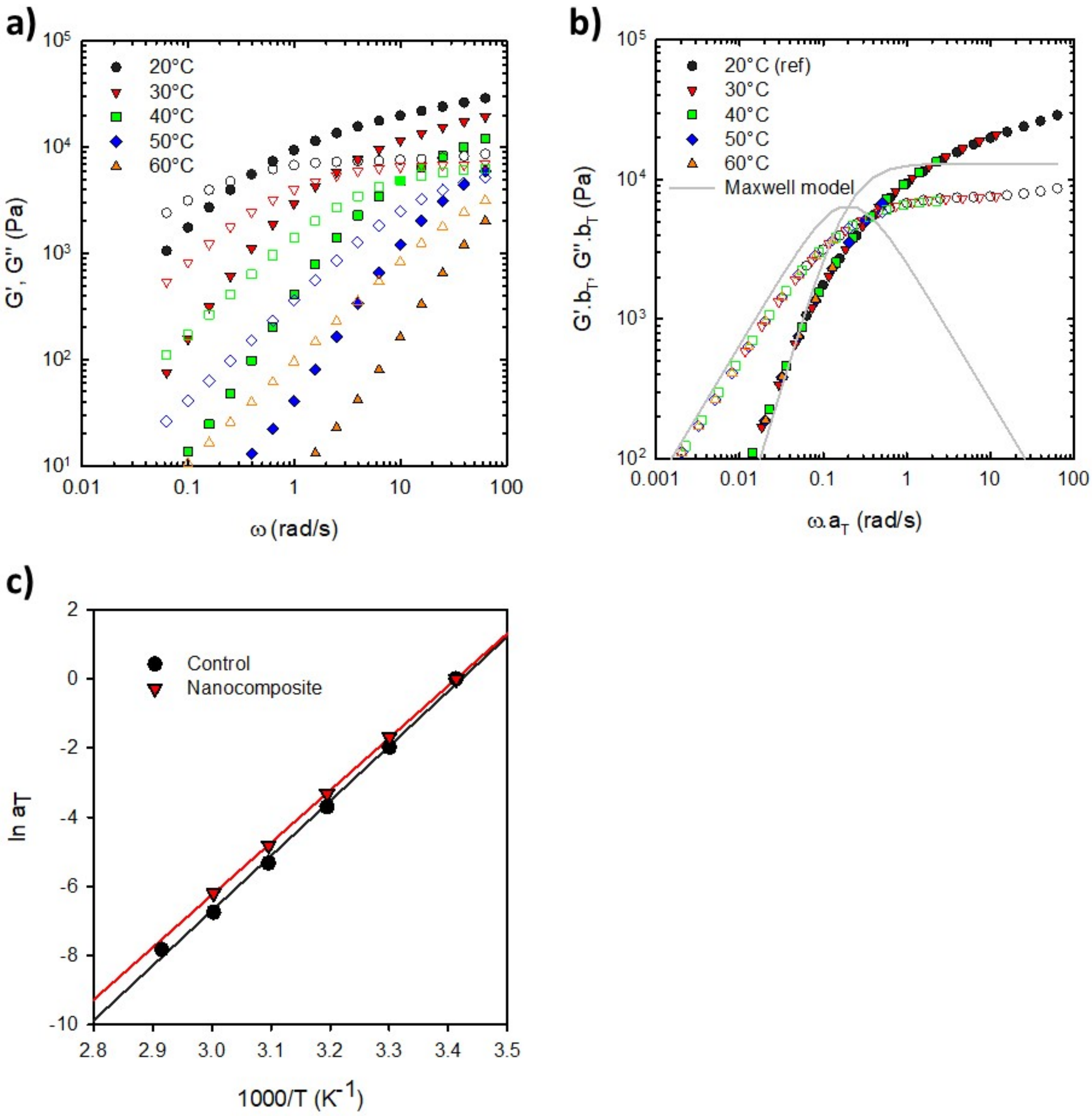

Figure S6. a) Storage (G', close symbols) and loss (G'', open symbols) moduli as a function of frequency (ω) for a hydrogel with C_{pol}=100 g/L and C_{full}=51 g/L measured at various temperature as indicated in the figure. b) Master curve of the same rheological data using 20°C as reference. The gray solid line is a Maxwell model with G=10 kPa and τ=3s. c) Arrhenius plot for the same hydrogel and a control sample with C_{pol}=100 g/L.

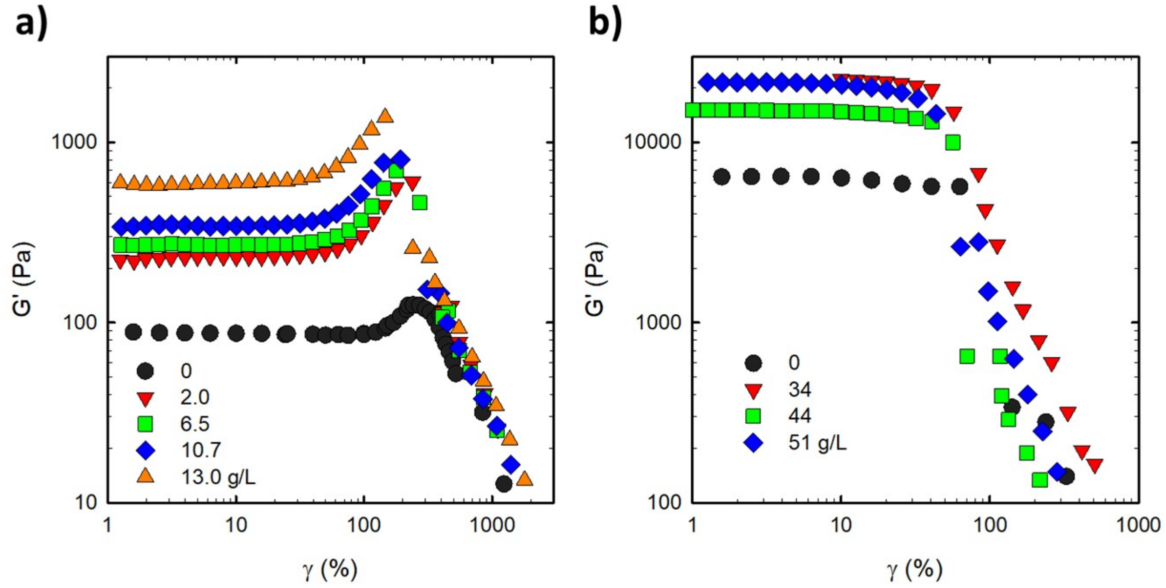

Figure S7. G' and G'' as a function of strain for hydrogels with C_{pol}= a) 50 g/L and b) 100 g/L and various fullerene concentrations indicated in legend, at T=20°C and ω=10 rad/s.

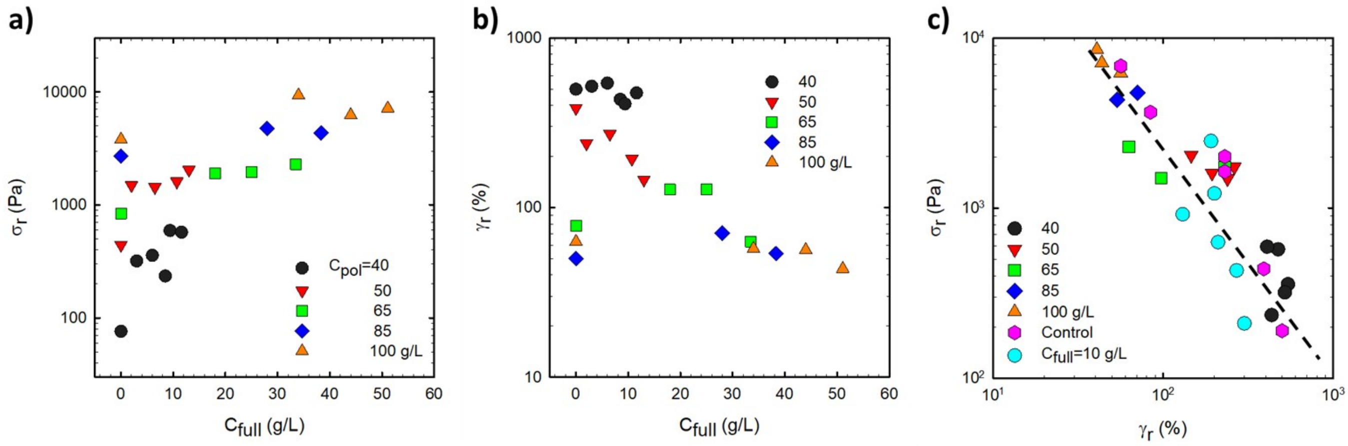

Figure S8. a) Stress and b) strain at rupture as a function of fullerene concentration with various C_{pol} as indicated in legend. c) Stress at rupture vs strain at rupture. Dashed line displays a power law with an exponent equal to -3/2.