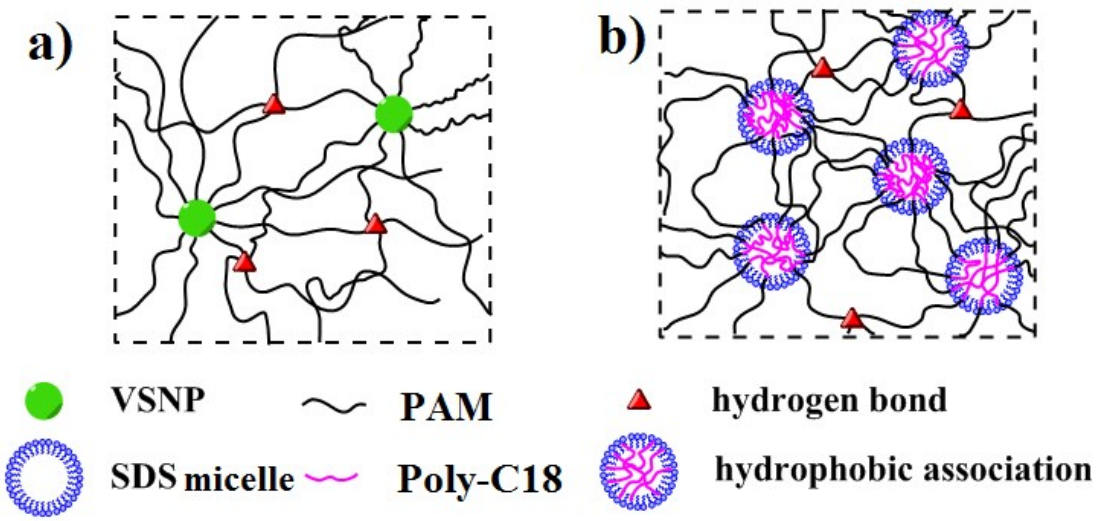
Electronic Supplementary Material (ESI) for Journal of Materials Chemistry B.

Electronic Supporting information

Robust and self-healable nanocomposite physical hydrogel facilitated by the synergy of ternary crosslinking points in a single network



Scheme S1. a) the DC-NCP gel crosslinked by hydrogen bonds among the grafted polymer chains as physical crosslinking points and VSNPs as analogous crosslinking points, and b) the DC-L gel crosslinked by hydrogen bonds among the hydrophilic PAM block and hydrophobic associations among the hydrophobic poly-C18 blcok.

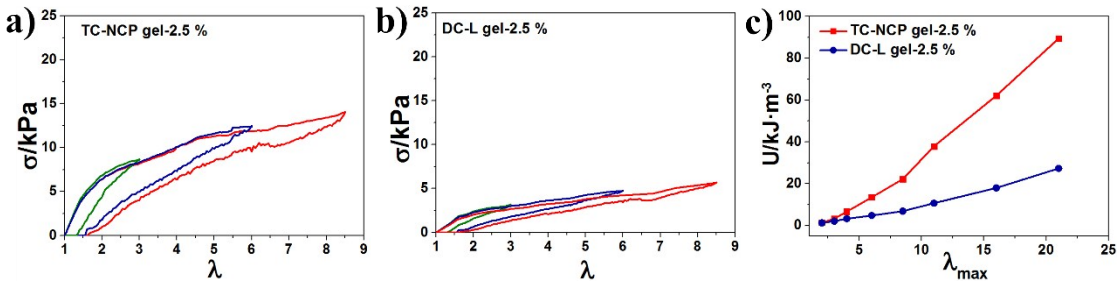


Figure S1. Loading–unloading experiments performed at different maximum stretch ratio (λ_{max}) for a) the TC-NCP gel-2.5 %, and b) the DC-L gel-2.5 %, and c) dissipated energy (U) of the gels as a function of λ_{max}.

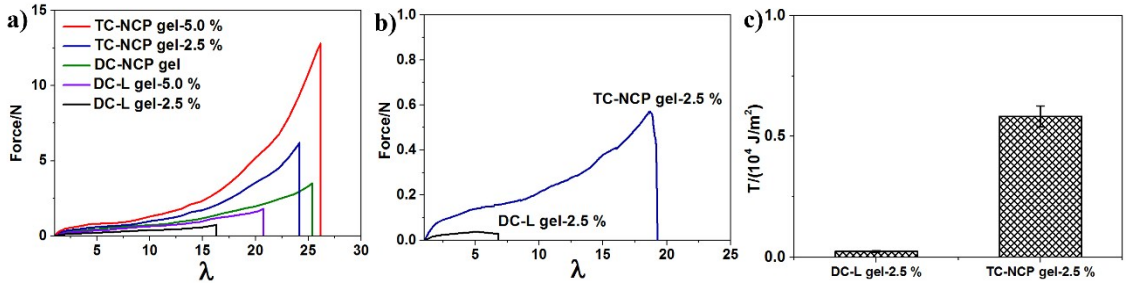


Figure S2. The force-stretch ratio (λ) curves for a) the unnotched and b) the notched film samples, c) the calculated tearing energy for the DC-L gel-2.5 %, and the TC-NCP gel-2.5 %. All the gel samples contain the same water content of 90 %, the VSNP content is fixed at 0.4 % relative to the weight of the monomer for the NCP gels.

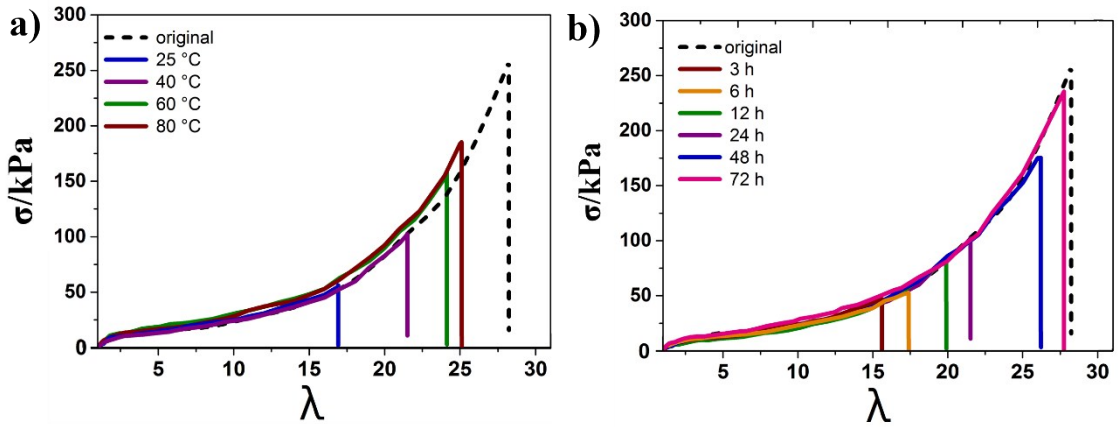


Figure S3. a) Stress-stretch ratio (σ-λ) curves of the original and the healed TC-NCP gel-5.0 % for 24 h at different temperature, and b) for different time at 40 oC.

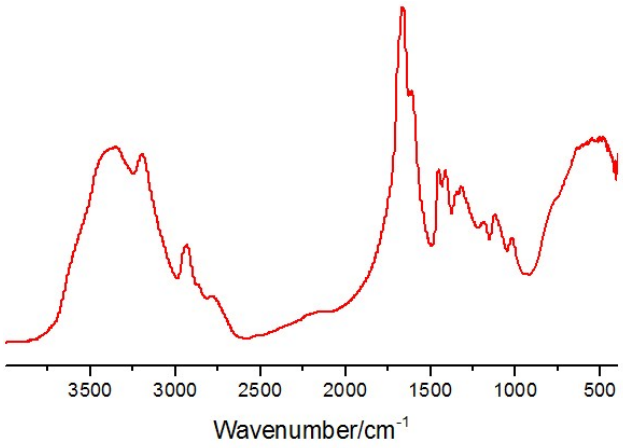


Figure S4. The FTIR results of DC-NCP gel are shown in Fig. S4. The FTIR specturm of lyophilize DC-NCP gel is almost the same with that of PAM (see also the ESI of J. Mater. Chem. B, 2015, 3, 1187), except a characterist absorption peak of Si-C at 1023 cm-1. This result indicates that all the vinyl groups on the surface of VSNPs have reacted during the polymerization process, i.e. polymer chains are grafted on the surface of VSNPs.