



Journal Name

ARTICLE

Supporting information for publication

Self-healable and tough nanocomposite hydrogel crosslinked by novel ultrasmall aluminum hydroxide nanoparticles

Haoyang Jiang, Gongzheng Zhang, Feibo Li, Yaqian Zhang, Yu lei, Yanhong Xia, Xianghu Jin, Xianqi Feng and Huanjun Li*
School of Chemistry and Chemical Engineering, Beijing Institute of Technology, Beijing 100081, P. R. China
E-mail: lihj@bit.edu.cn.
Tel: +86-10-68918530

Tab. S1 Compositions of the initial pre-gel solutions for Al-NC gels.

Hydrogels	AMPS/g	AAM/g	Al(OH) ₃ /g ^{a)}	H ₂ O /g	IR2959 ^{b)} /mg
AM80-Al3	1.66	2.28	0.29	8	30
AM80-Al6	1.66	2.28	0.57	8	30
AM80-Al9	1.66	2.28	0.86	8	30
AM80-Al12	1.66	2.28	1.14	8	30
AM70-Al6	2.49	2.00	0.57	8	30
AM90-Al6	0.83	2.57	0.57	8	30

a) The concentration of the prepared AH NPs sol is 17 wt%. b) IR2959 is 2-hydroxy-4'-(2-hydroxyethoxy)-2-methyl-propiopehe.

Tab. S2 Mechanical properties of original and self-healed Al-NC gels
with different AH NPs content and AAM molar ratio

Sample	Original Tensile Stress (KPa)	Original fracture energy (KJ/m ³)	Self-healed Tensile Stress (kPa)	Self-healed fracture energy(KJ/m ³)
AM80-Al3	138.8	186.1	67.1	72.3
AM80-Al6	282.7	124.8	244.3	109.2
AM80-Al9	332.4	96.3	142.5	30.8
AM80-Al12	510.7	125.0	144.2	31.7
AM70-Al6	154.3	83.5	99.0	63.9
AM90-Al6	359.9	129.6	254.9	100.9

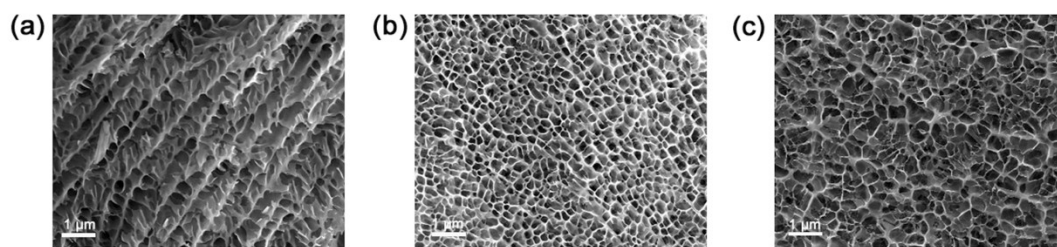


Fig. S1 SEM images of Al-NC gels with different molar ratio of AAm of (a) 70 mol%, (b) 80 mol%, (c) 90 mol%, at the fixed 9 wt% AH NPs.

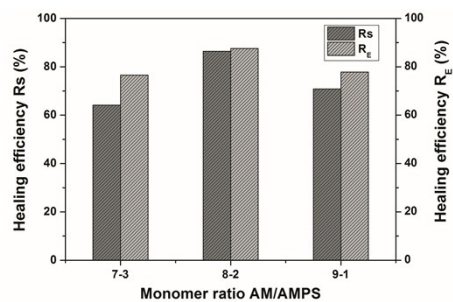


Fig. S2 The self-healing efficiency of the healed Al-NC gels with various AAm molar ratio (70 mol%, 80 mol% and 90 mol%) at fixed AH NPs content of 6 wt%.