Electronic Supplementary Material (ESI) for Soft Matter.

Supporting Information

Visible light triggered controlled formation of rapidly self-Healing hydrogels based on thiol-disulfide exchange

Linlin Wang,[a,b] *Qingchen Cao,* [b,c] *Xing Wang,*[*, b,c] *and Decheng Wu*[*,b,d]

a) Key Laboratory of Special Functional Aggregated Materials (Shandong University), Ministry of Education; School of Chemistry and Chemical Engineering, Shandong University, Jinan, 250100 P. R. China

b) Beijing National Laboratory for Molecular Sciences, Institute of Chemistry, Chinese Academy of Sciences, Beijing 100190, China

c) University of Chinese Academy of Sciences, Beijing 100049, China

d) Department of Biomedical Engineering, Southern University of Science and Technology, Shenzhen, Guangdong 518055, China

*Corresponding Author：E-mail: wangxing@iccas.ac.cn and dcwu@iccas.ac.cn

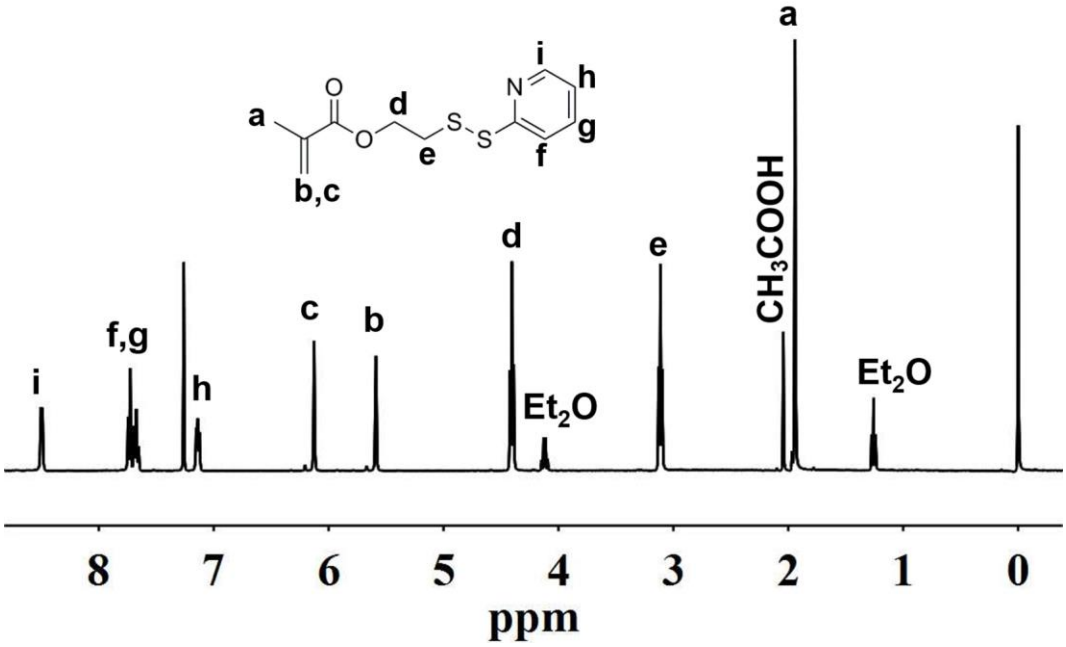

Fig. S1. ^{1}H NMR spectrum of **EMA-SS-Py** in $CDCl_3$.

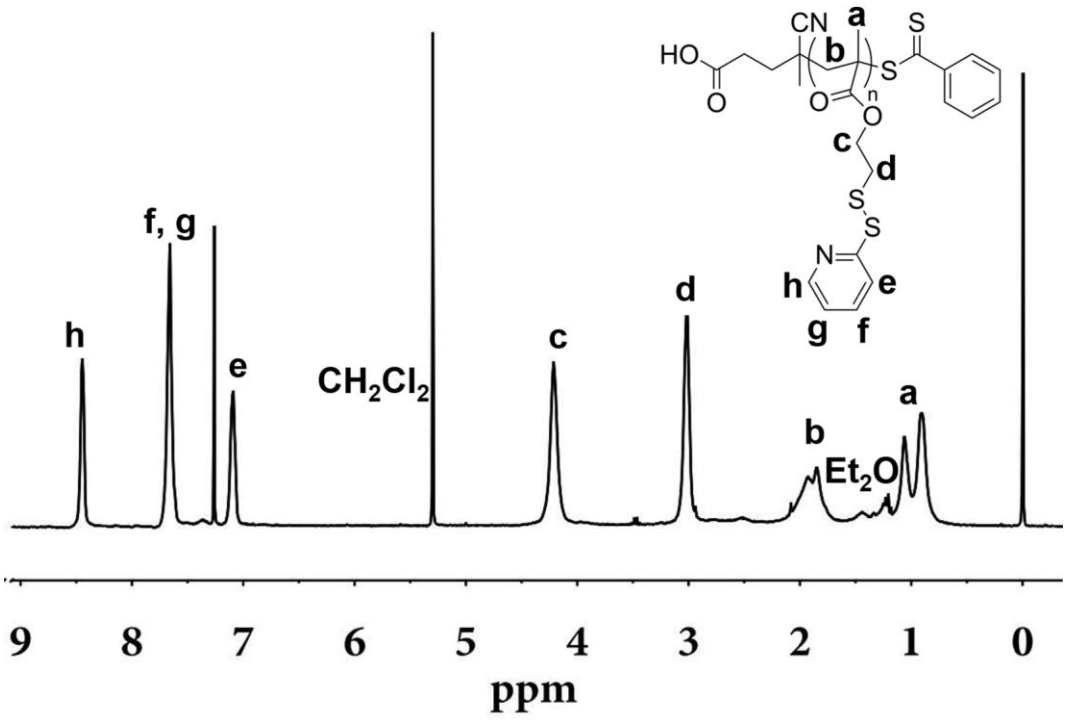

Fig. S2. ^{1}HNMR spectrum of P(EMA-SS-Py) in $CDCl_3$.

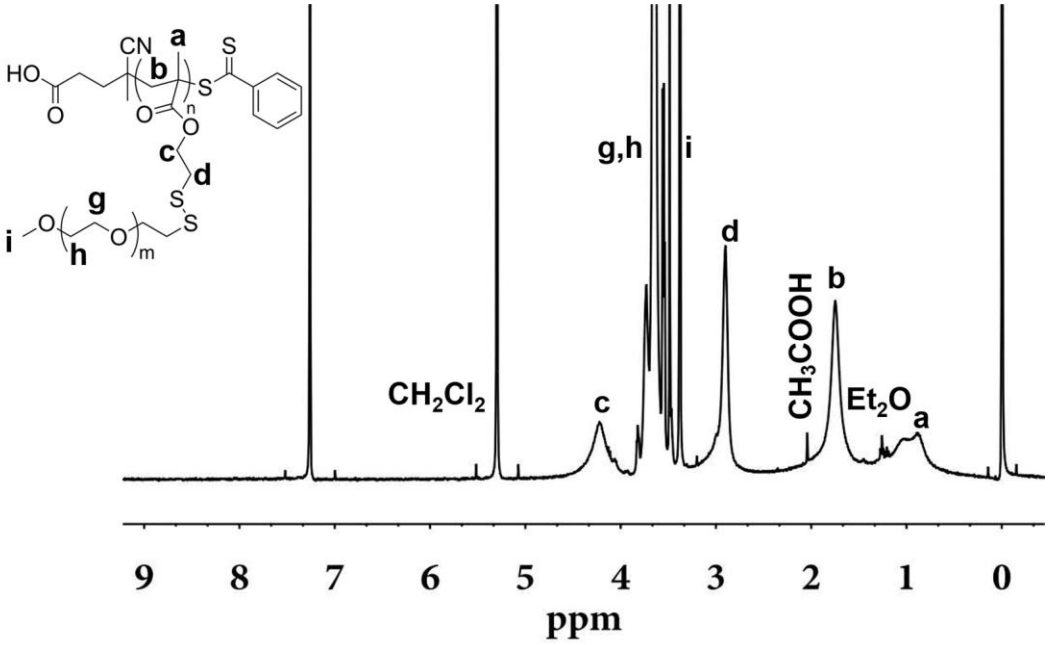

Fig. S3. ^{1}HNMR spectrum of P(EMA-SS-PEG) in $CDCl_3$.

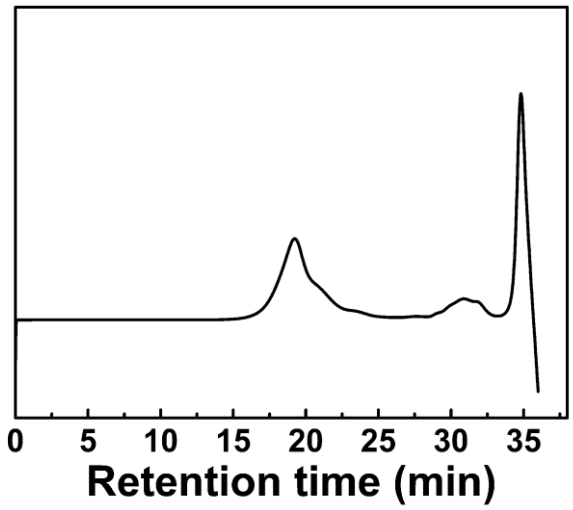

Fig. S4. GPC curve of P(EMA-SS-PEG).

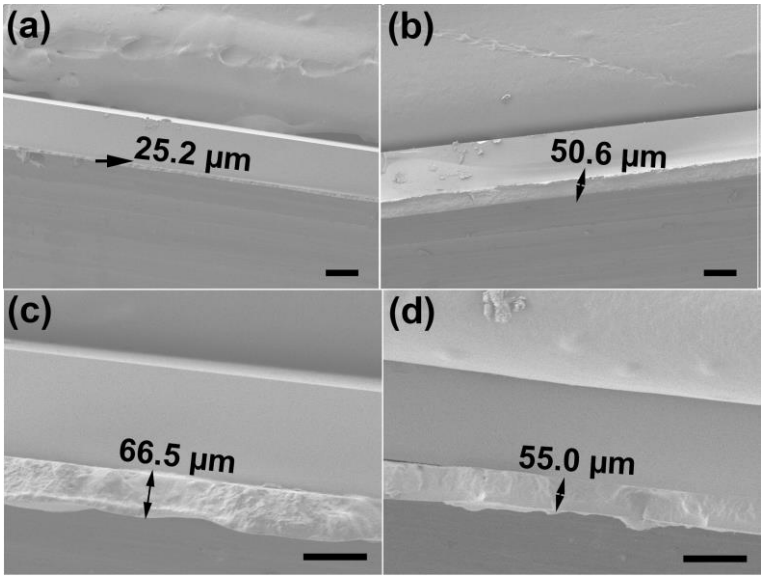

Fig. S5. SEM images of the coating thickness with different amount of hydrogel precursor solution and irradiation time: (a) 20 μL+10 min, (b) 30 μL+10 min, (c) 40 μL+10 min, (d) 40 μL+20 min. (Scale bar: 100 μm).

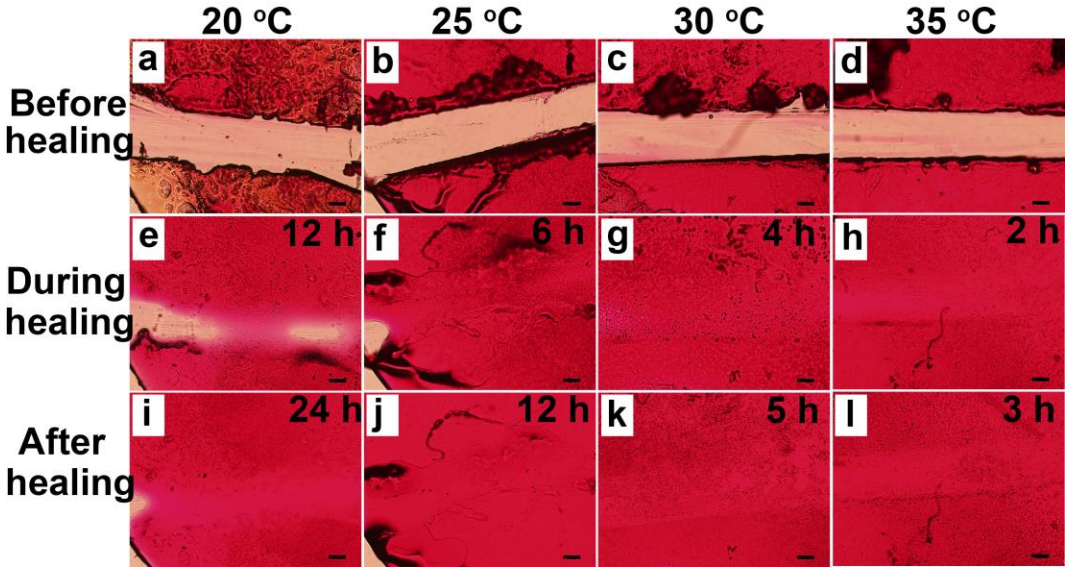

Fig. S6. Microscope images of self-healing for hydrogel coatings under different temperature conditions. (Scratch width: 270 μm, humidity: 40% RH, scale bar: 100 μm).

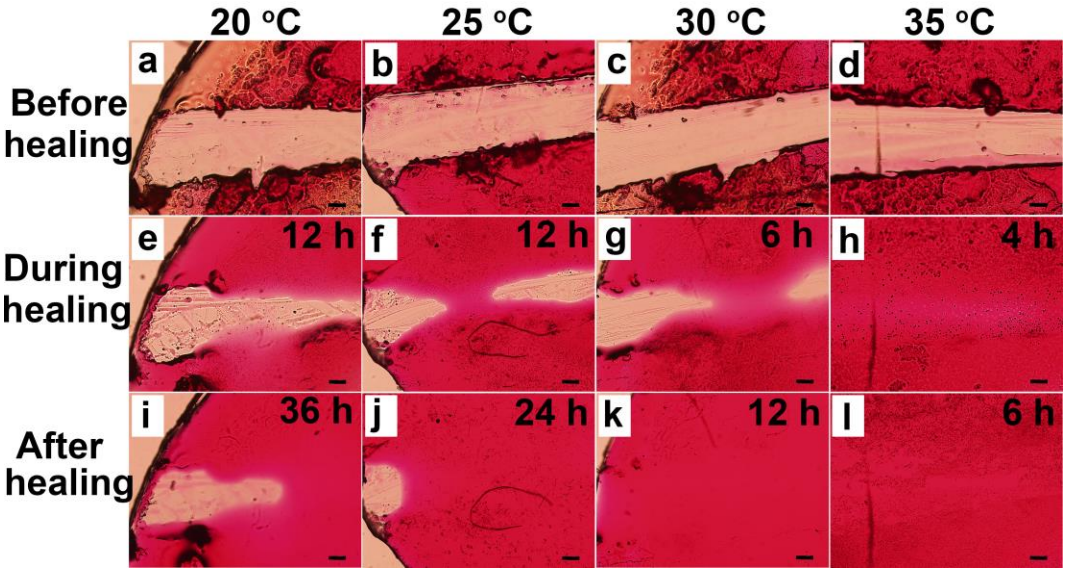

Fig. S7. Microscope images of self-healing for hydrogel coatings under different temperature conditions. (Scratch width: 360 μm, humidity: 40% RH, scale bar: 100 μm).

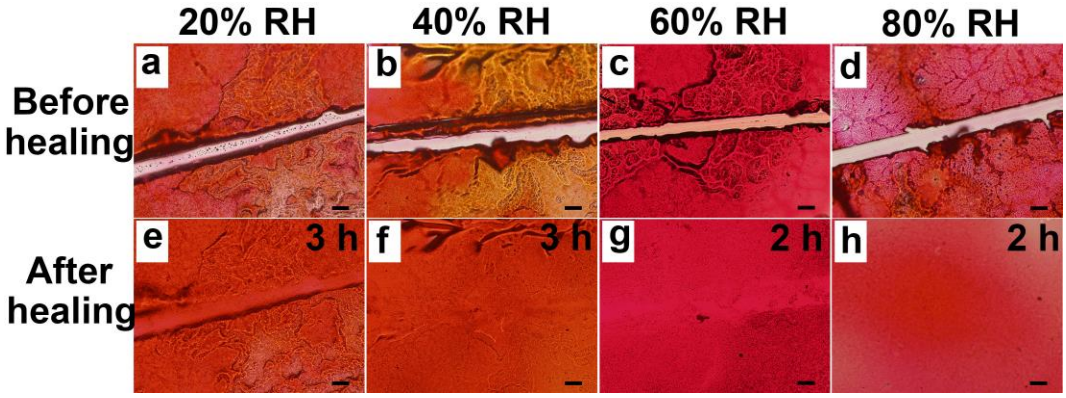

Fig. S8. Microscope images of self-healing for hydrogel coatings under different humidity conditions. (Scratch width: ～90 μm, temperature: 25 °C, scale bar:100 μm).

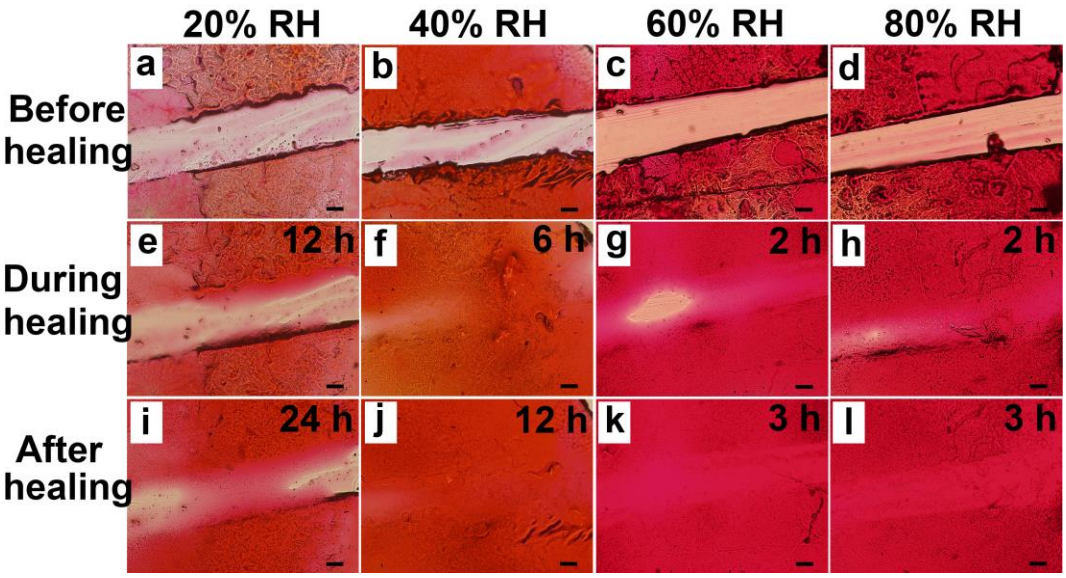

Fig. S9. Microscope images of self-healing for hydrogel coatings under different humidity conditions. (Scratch width: 270 μm, temperature: 25 °C, scale bar: 100 μm).