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

—Supporting Information—

Plant Oil and Amino Acid-Derived Elastomers with Rapid Room Temperature Self-Healing Ability

Wenjin Guo, Xiaohan Wang, Xingyuan Lu, Xiang Li, Yang Li and Junqi Sun*

State Key Laboratory of Supramolecular Structure and Materials, College of Chemistry, Jilin University, Changchun 130012, P.R. China.

* Corresponding author: yanglichem@jlu.edu.cn

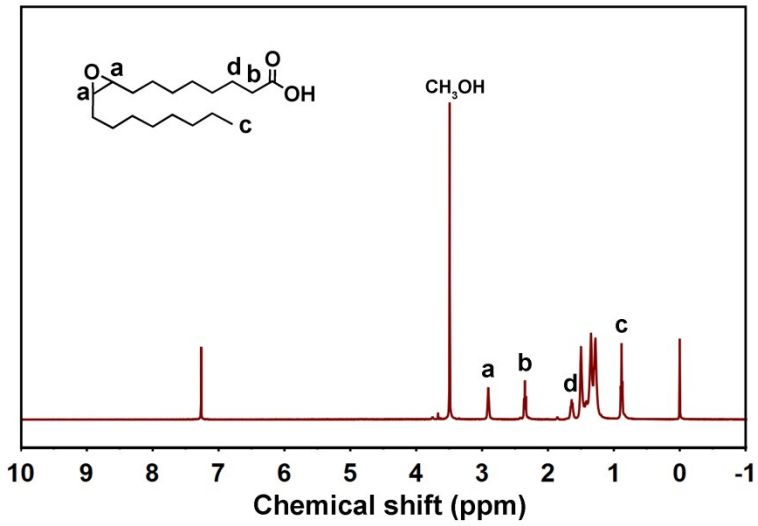

Fig. S1 ^{1}H-NMR ($CDCl_3$, 500 MHz) spectrum of EOA.

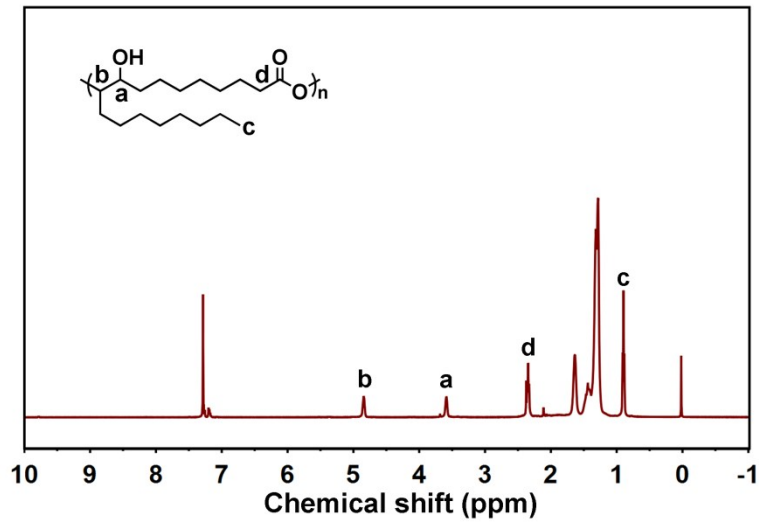

Fig. S2 ^{1}H-NMR ($CDCl_3$, 500 MHz) spectrum of POA.

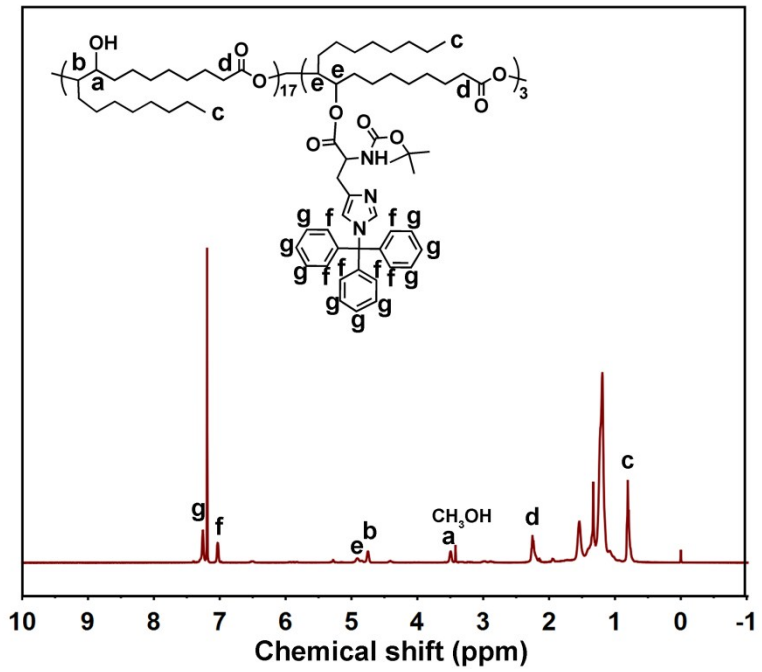

Fig. S3 ^{1}H-NMR ($CDCl_3$, 500 MHz) spectrum of POA-BTH.

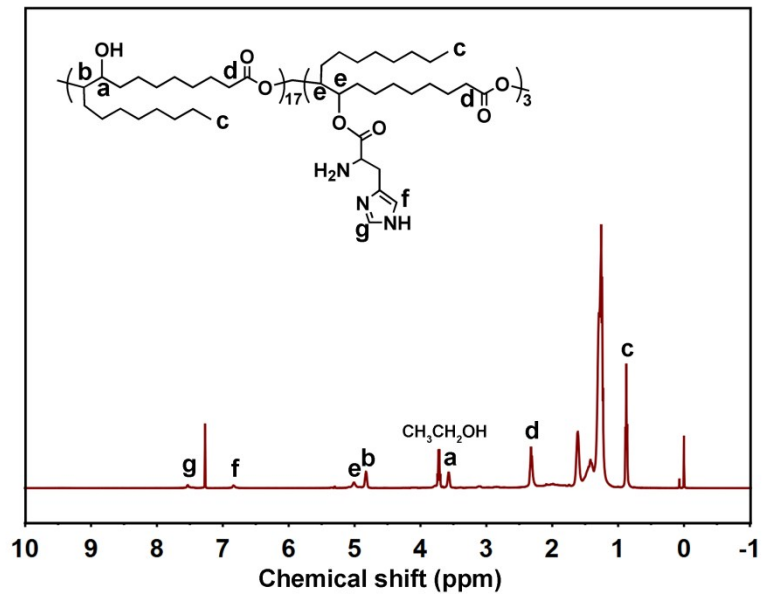

Fig. S4 ^{1}H-NMR ($CDCl_3$, 500 MHz) spectrum of POA-His.

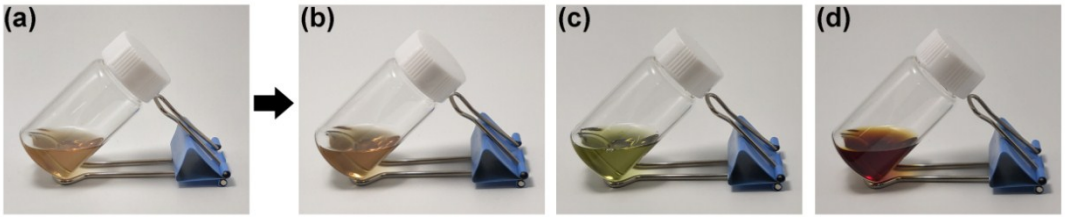

Fig. S5 Photo images of (a) POA THF solution (0.67 M, 3 mL) and POA THF solutions mixed with (b) $ZnCl_2$ (19.0 mg), (c) $CuCl_2$ (18.7 mg) and (d) $FeCl_3$ (15.1 mg) salts.

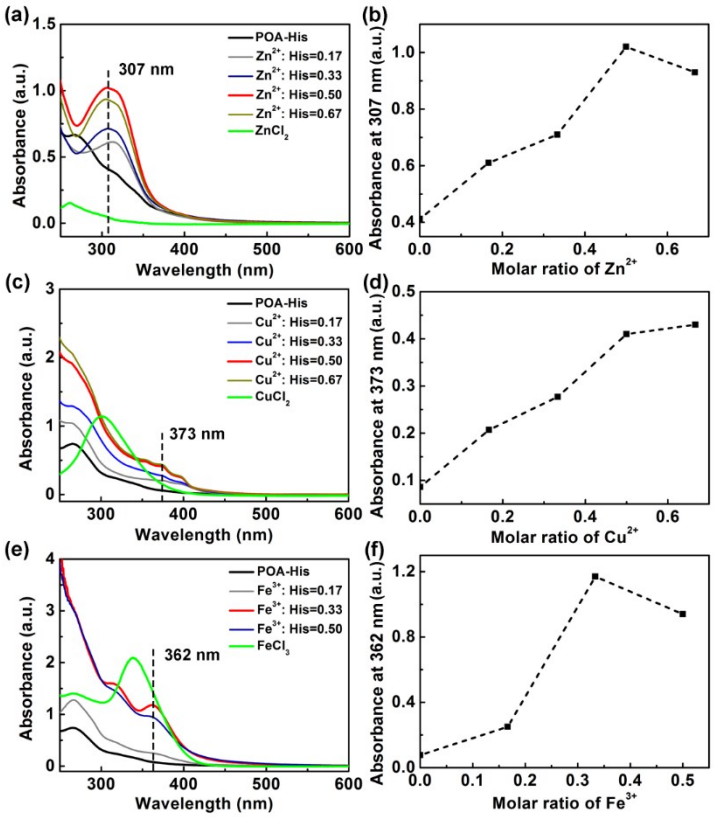

Fig. S6 (a) UV-Vis absorption titration spectra of THF solutions of POA-His (5.56×10^{-3} M) with $ZnCl_2$. (b) Diagram of the change of absorbance at 307 nm with the addition of $ZnCl_2$. (c) UV-Vis absorption titration spectra of THF solutions of POA-His (5.56×10^{-3} M) with $CuCl_2$. (d) Diagram of the change of absorbance at 373 nm with the addition of $CuCl_2$. (e) UV-Vis absorption titration spectra of THF solutions of POA-His (5.56×10^{-3} M) with $FeCl_3$. (f) Diagram of the change of absorbance at 362 nm with the addition of $FeCl_3$.

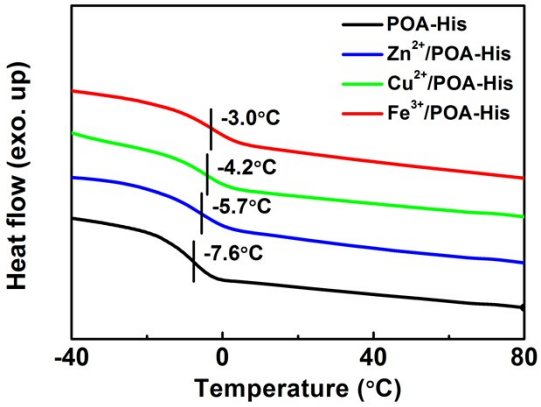

Fig. S7 DSC curves of POA-His, Zn^{2+}/POA-His, Cu^{2+}/POA-His and Fe^{3+}/POA-His films.

Table S1. Mechanical properties of M^{n+}/POA-His films with M^{n+} being Zn^{2+}, Cu^{2+} and Fe^{3+}.

	Zn^{2+}/POA-His	**Cu^{2+}/POA-His**	**Fe^{3+}/POA-His**
Stress (MPa)	3.90	4.22	5.20
Strain (%)	231	205	178
Young's moduli (MPa)	3.75	4.03	4.42

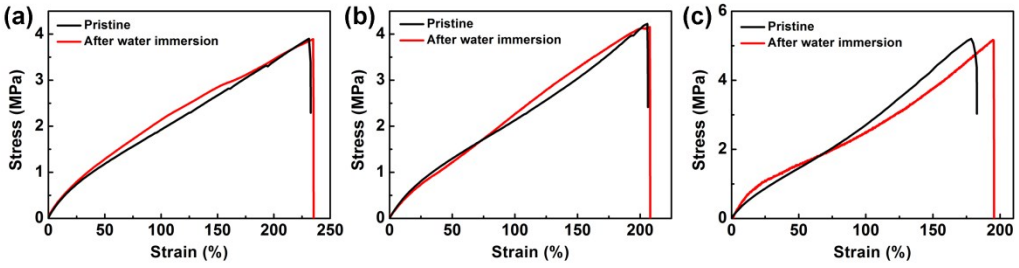

Fig. S8 Stress-strain curves of (a) Zn^{2+}/POA-His, (b) Cu^{2+}/POA-His and (c) Fe^{3+}/POA-His films before and after immersion in water.

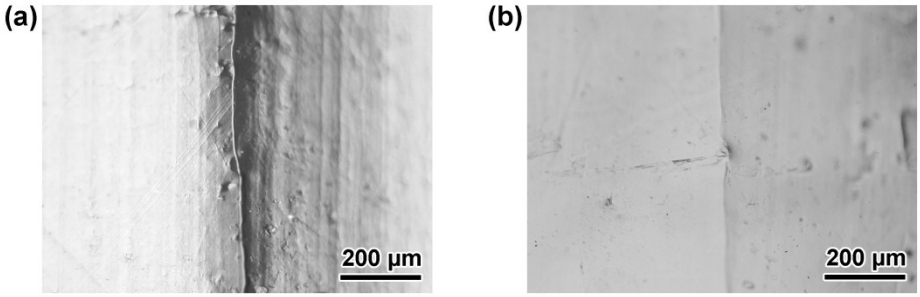

Fig. S9 Microscope images of the cut Zn^{2+}/POA-His films after healing for (a) 10 s and (b) 1 h.

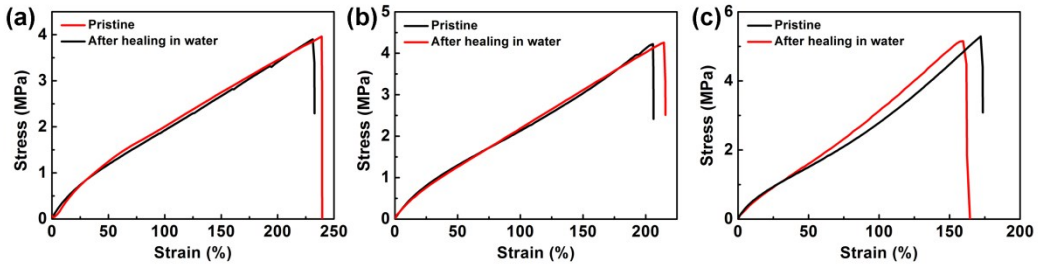

Fig. S10 Stress-strain curves of (a) Zn^{2+}/POA-His, (b) Cu^{2+}/POA-His and (c) Fe^{3+}/POA-His films and the cut films after healing in water.

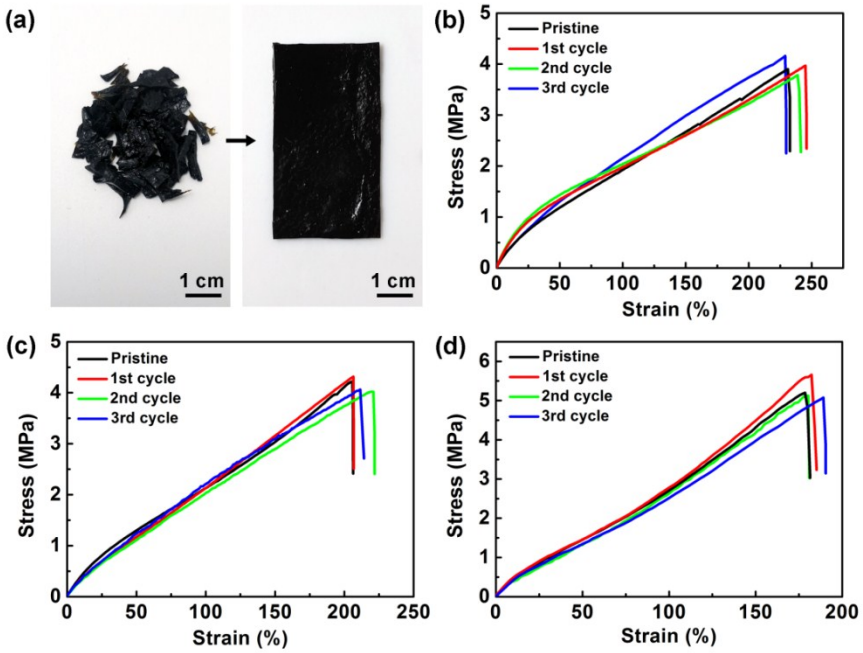

Fig. S11 (a) Recycling test of Fe^{3+}/POA-His film. (b-d) Stress-strain curves of (b) Zn^{2+}/POA-His, (c) Cu^{2+}/POA-His and (d) Fe^{3+}/POA-His films after different cycles of recycling process.

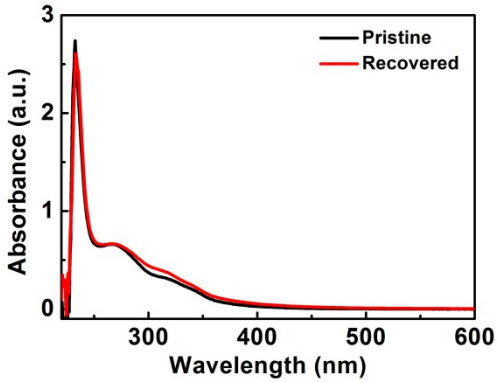

Fig. S12 UV-Vis absorption spectra of the pristine POA-His polymer and the recovered POA-His polymer.