

## Surface modified halloysite nanotubes enhanced imine based epoxy composites with high self-healing efficiency and excellent mechanical property

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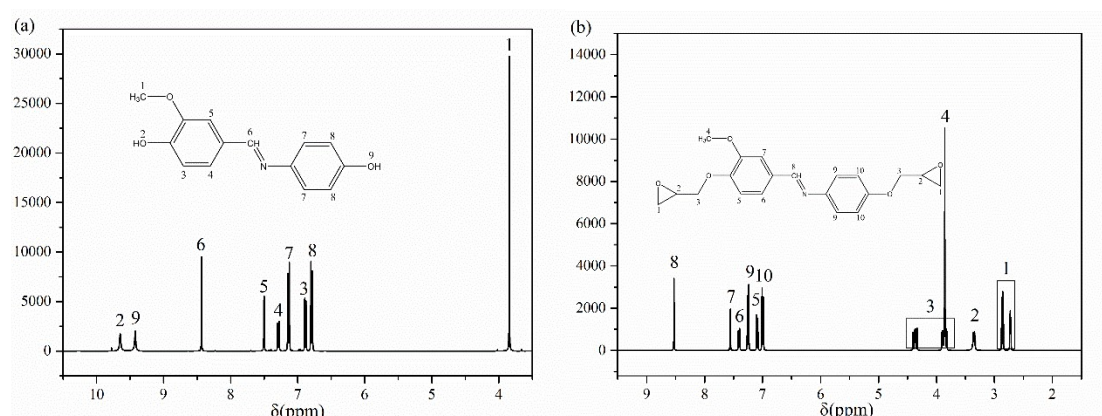


Fig. S1. <sup>1</sup>H NMR spectrum of IMP and IMSER.

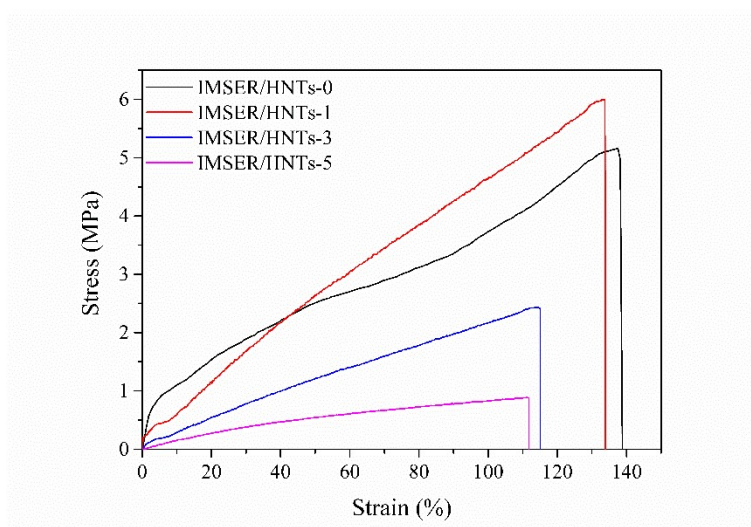


Fig. S2. Stress-strain curves of the four epoxy composites.

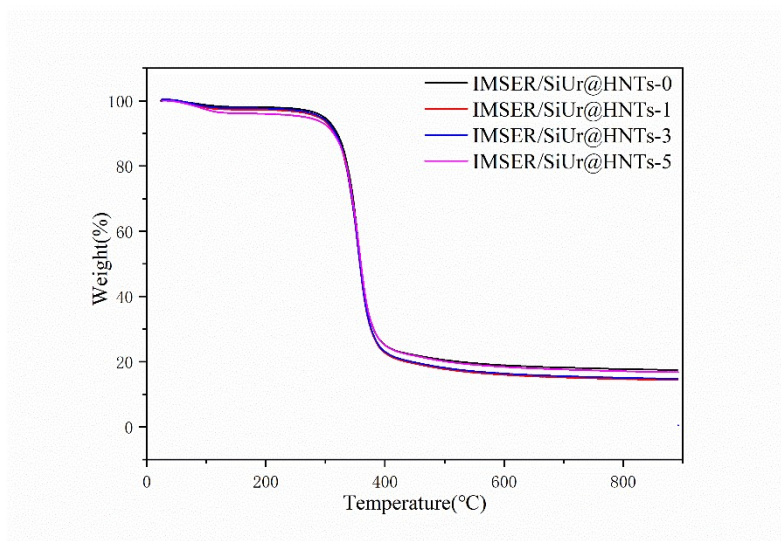


Fig. S3. TGA curves of IMSER/SiUr@HNTs-n.

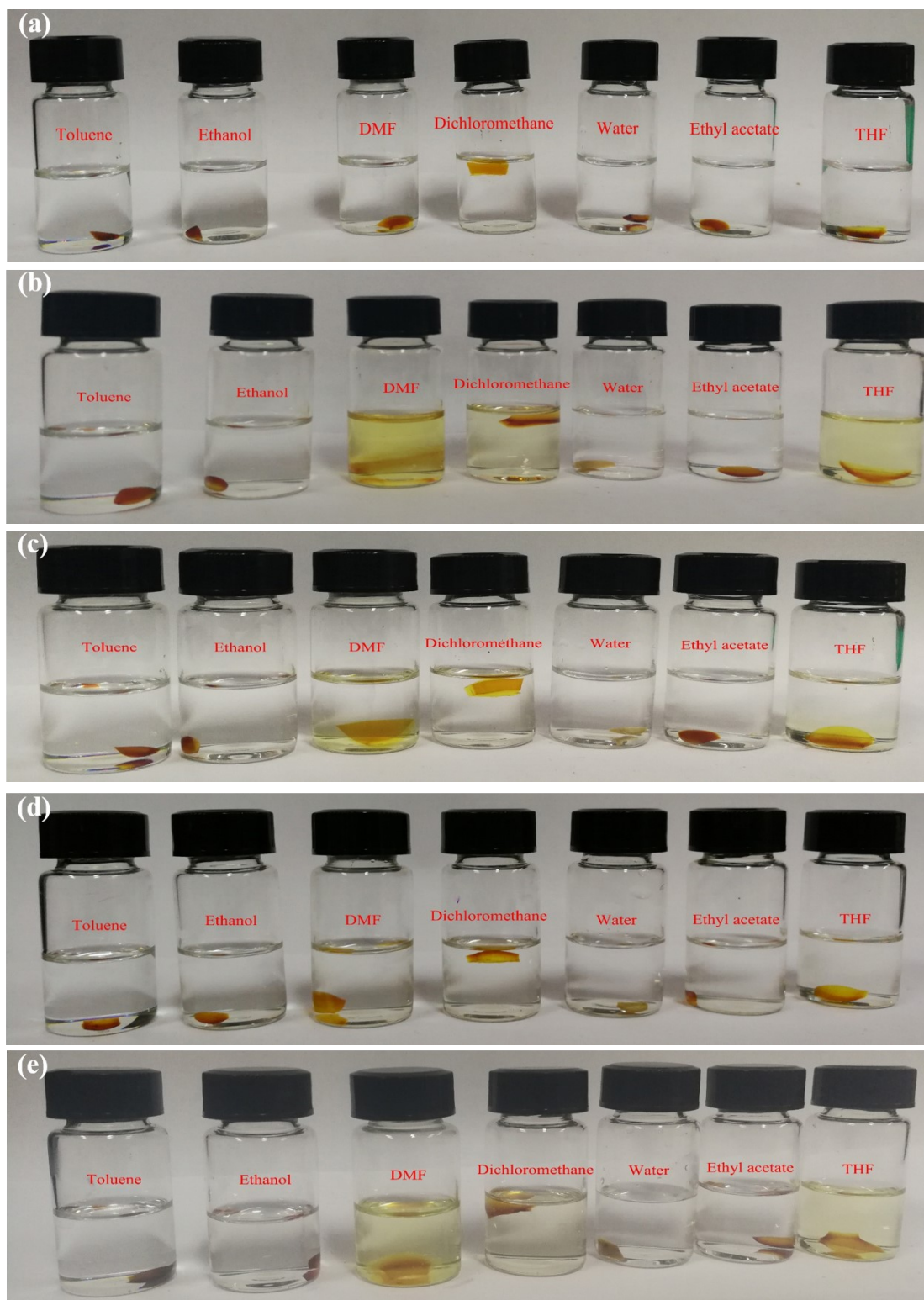


Fig. S4 The solvent resistance of (a) initial, (b) IMSER/SiUr@HNTs-0, (c) IMSER/SiUr@HNTs-1, (d) IMSER/SiUr@HNTs-3, (e) IMSER/SiUr@HNTs-5 in different solutions.

Table S1. The tensile strength and self-healing efficiency of IMSER/SiUr@HNTs-3.

| Temperature<br>(°C) | Time<br>(h) | Strain<br>(%) | Tensile strength<br>(MPa) | Self-healing efficiency<br>(%) |
|---------------------|-------------|---------------|---------------------------|--------------------------------|
| 80                  | 3           | 12.03         | 1.30                      | 18.29                          |
| 80                  | 6           | 25.59         | 2.09                      | 29.41                          |
| 80                  | 9           | 29.43         | 2.27                      | 31.91                          |
| 120                 | 3           | 47.73         | 3.94                      | 55.30                          |
| 120                 | 6           | 68.87         | 5.84                      | 82.10                          |
| 120                 | 9           | 86.35         | 6.67                      | 90.00                          |
| 120                 | 12          | 95.99         | 7.10                      | 99.80                          |

Table S2. The quality increase rate of the four epoxy composites after swelling.

| Sample                | Toluene<br>(%) | Ethanol<br>(%) | DMF<br>(%) | Dichloro<br>methane<br>(%) | Water<br>(%) | Ethyl<br>acetate<br>(%) | THF<br>(%) |
|-----------------------|----------------|----------------|------------|----------------------------|--------------|-------------------------|------------|
| IMSER/SiUr@<br>HNTs-0 | 74.60          | 110.32         | /          | 661.00                     | 22.03        | 127.70                  | 421.18     |
| IMSER/SiUr@<br>HNTs-1 | 51.01          | 87.31          | 971.31     | 616.65                     | 12.58        | 91.54                   | 414.64     |
| IMSER/SiUr@<br>HNTs-3 | 57.00          | 73.77          | 666.53     | 374.23                     | 12.83        | 68.37                   | 381.63     |
| IMSER/SiUr@<br>HNTs-5 | 73.53          | 102.85         | /          | 703.94                     | 14.70        | 109.58                  | 614.37     |