

**Supporting Information**

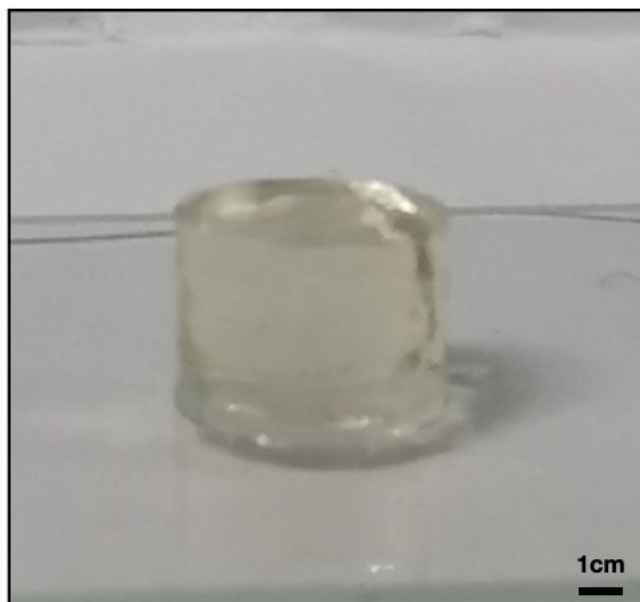
**Atmospheric Humidity Triggered Reversible Spin-State  
Switching**

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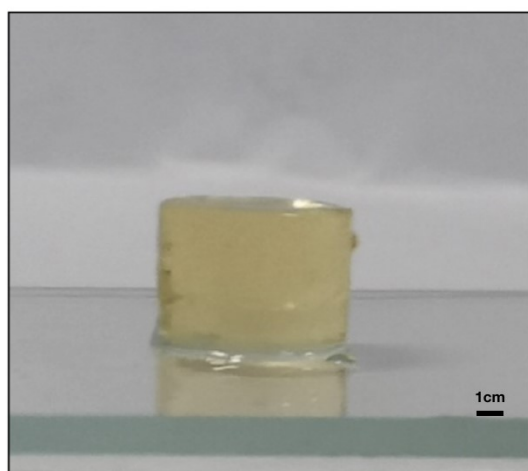
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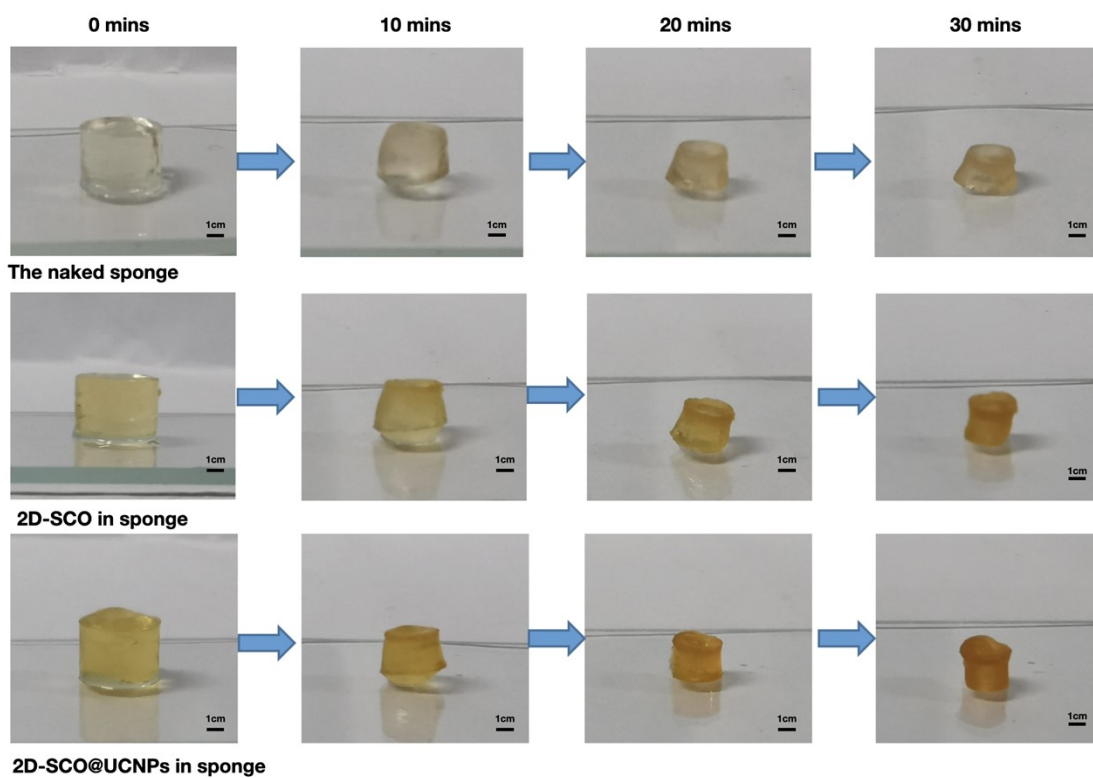
Nanjing, 211189, P.R. China. E-mail: [luoyh2016@seu.edu.cn](mailto:luoyh2016@seu.edu.cn)



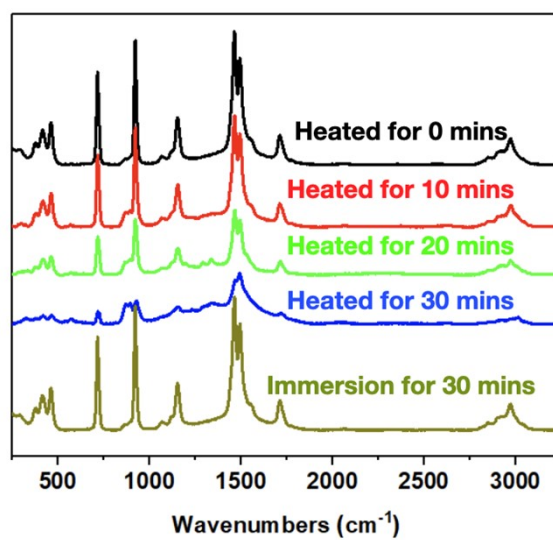
**Figure S1.** Optical image of the naked sponge.



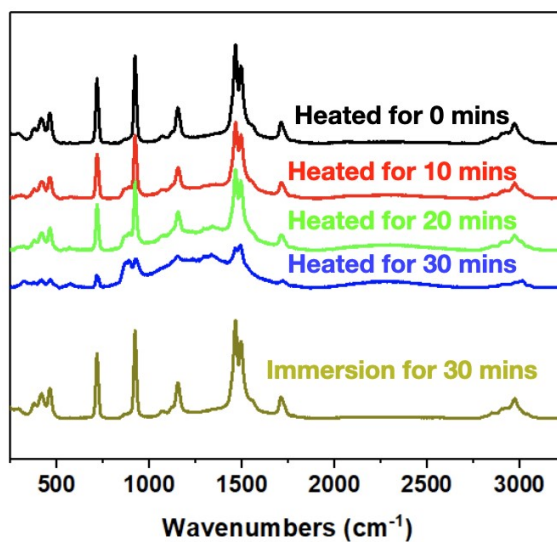
**Figure S2.** Optical image of 2D-SCO in the sponge



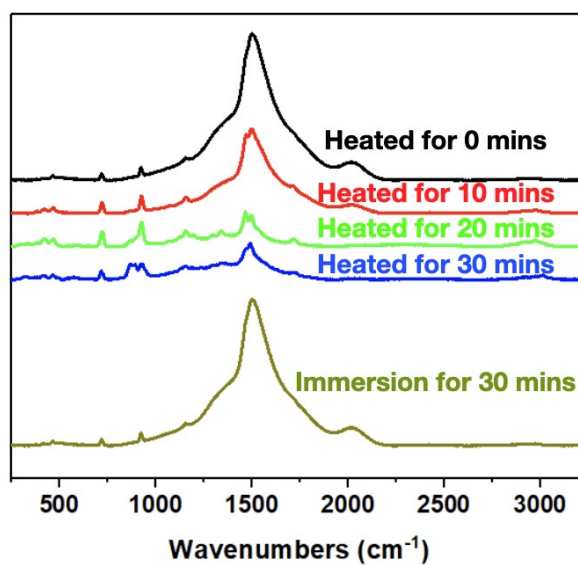
**Figure S3.** Photo images of sponges upon heating under 45 °C for 30 mins



**Figure S4.** Raman spectra illustrate the shrinking and restoration of 2D-SCO in the sponge.



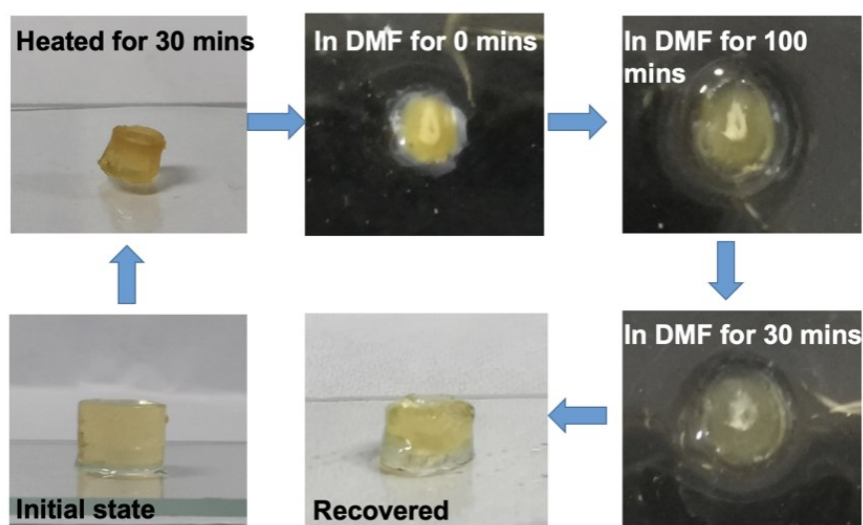
**Figure S5.** Raman spectra illustrate the shrinking and restoration of 2D-SCO@UCNPs in the sponge.



**Figure S6.** Raman spectra illustrate the shrinking and restoration of 2D-SCO@UCNPs in the sponge.



**Figure S7.** Recovery of 2D-SCO@UCNPs in the sponge upon DMF immersion.



**Figure S8.** Recovery of 2D-SCO in the sponge upon DMF immersion.