

Supporting Information for

A Compressible Mesoporous SiO₂ Sponge Supported by Carbon Nanotube Network

Yanbing Yang,^{1,2} Enzheng Shi,² Peixu Li,³ Dehai Wu,³ Shiting Wu,² Yuanyuan Shang,² Wenjing Xu,² Anyuan Cao,^{2*} Quan Yuan^{1*}

¹ Key Laboratory of Analytical Chemistry for Biology and Medicine (Ministry of Education), College of Chemistry and Molecular Sciences, Wuhan University, Wuhan 430072, China

² Department of Materials Science and Engineering, College of Engineering, Peking University, Beijing 100871, P. R. China

³ Department of Mechanical Engineering, Tsinghua University, Beijing 100084, P. R. China

Figure S1.

Figure S2.

Figure S3.

Figure S4.

Figure S5.

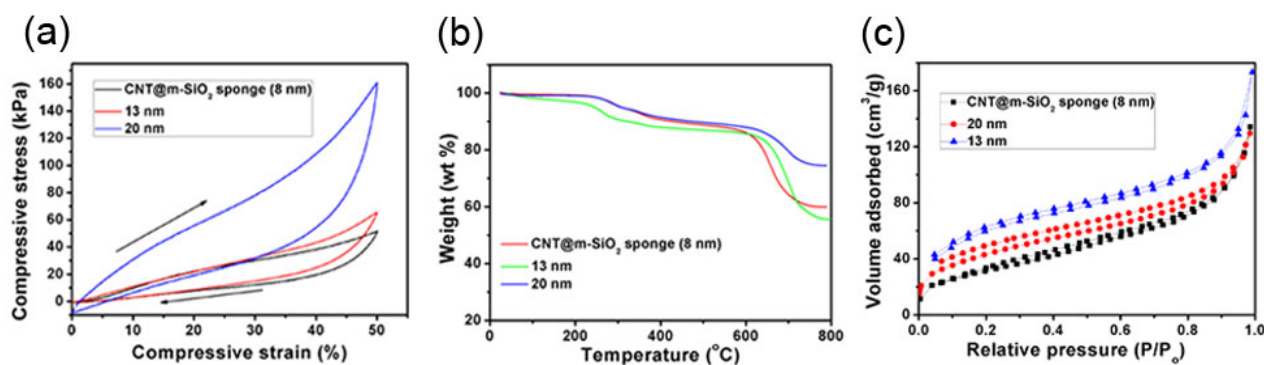


Figure S1. Structure characterization and thermal stability of CNT@m-SiO₂ sponges under different m-SiO₂ coating thickness. Compressive stress-strain curves (a), TGA (b) and N₂ adsorption desorption isotherms (c) of CNT@m-SiO₂ sponges under m-SiO₂ thickness from 8 to 20 nm.

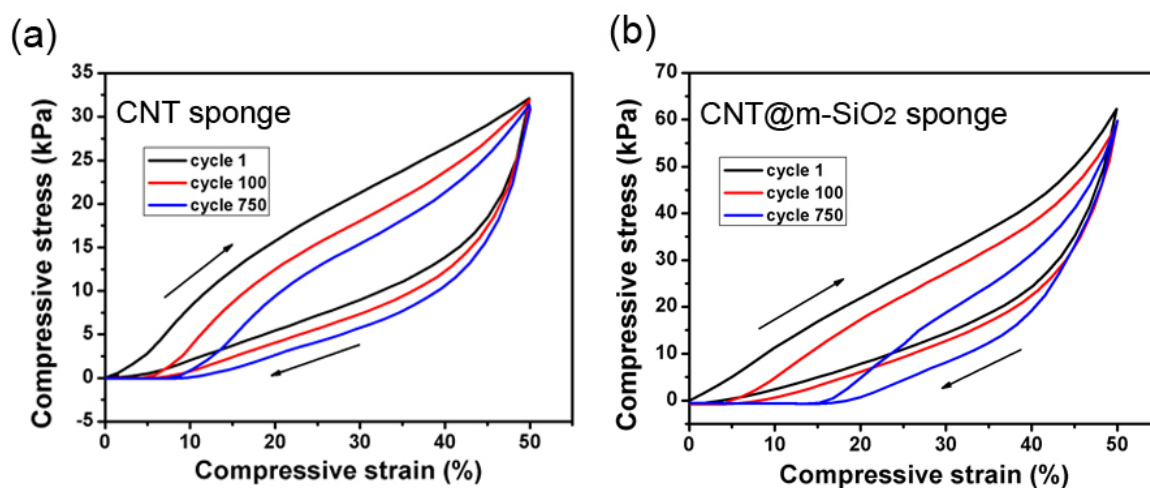


Figure S2. Compression behavior of CNT and CNT@m-SiO₂ sponges. (a) Loading and unloading compressive stress-strain curves of a CNT sponge at $\epsilon=50\%$. Curves of cycle 1, 100 and 750 are plotted. (b) Compressive stress-strain curves of a CNT@m-SiO₂ sponge at cycle 1, 100 and 750.

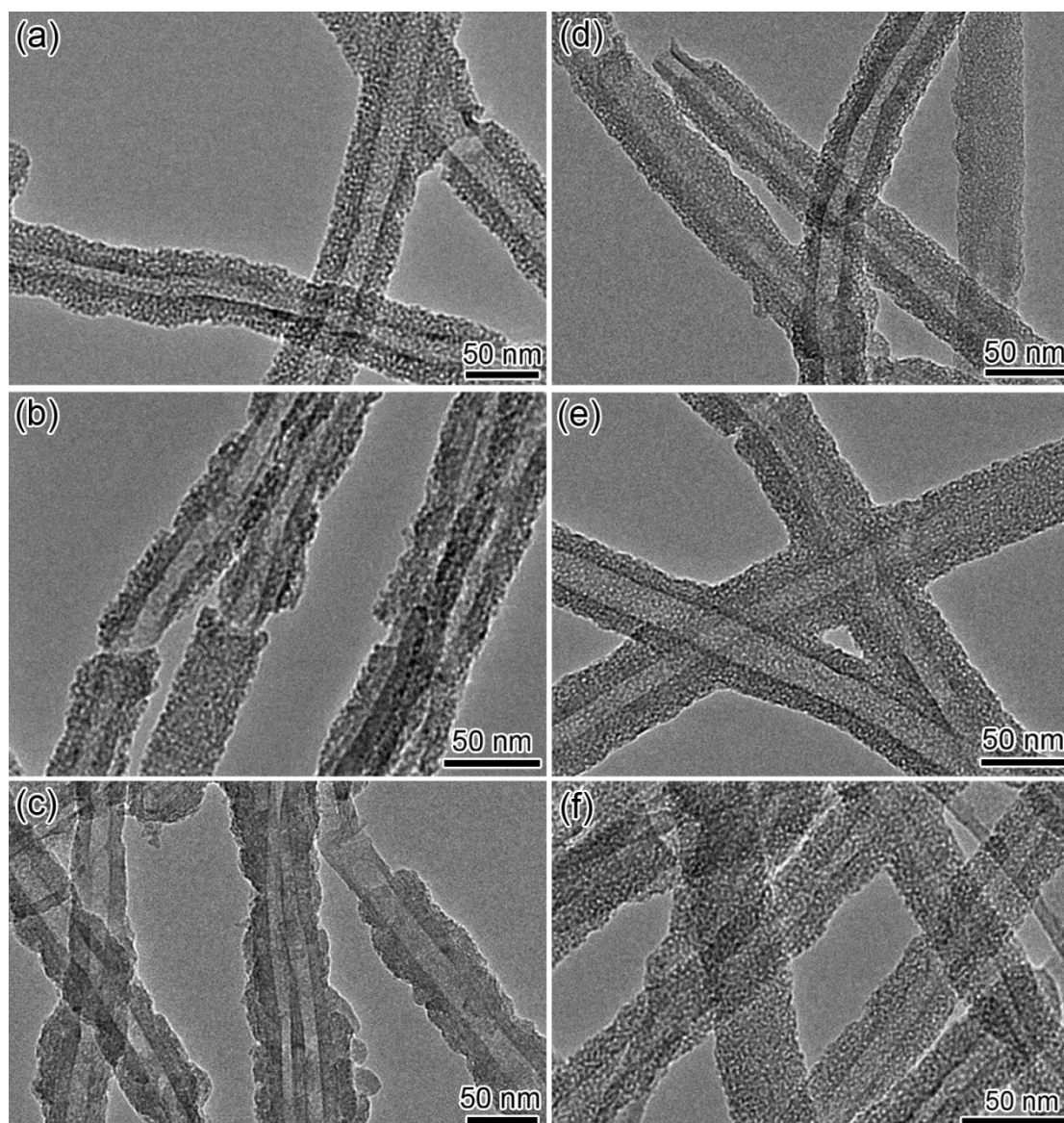


Figure S3. Tailoring morphology and thickness of the m-SiO₂ coating. (a-c) TEM images of CNT@m-SiO₂ sponges with different morphologies synthesized by different CTAB/CNTs weight ratios of (a) 30:1, (b) 10:1, (c) 2:1. (d-f) TEM images of CNT@m-SiO₂ sponges with different m-SiO₂ thicknesses synthesized by different TEOS amount of (d) 0.03 g, (e) 0.05 g and (f) 0.07 g.

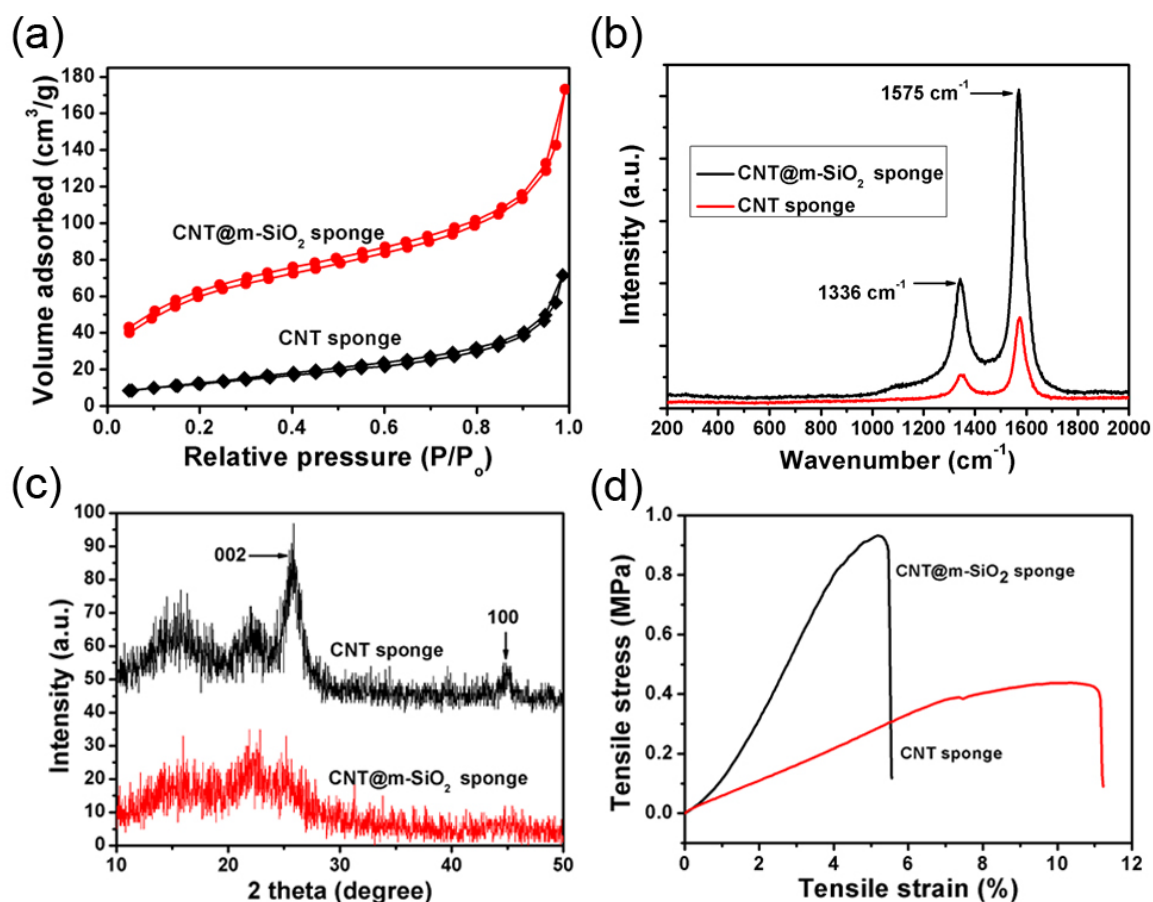


Figure S4. Characterization of CNT and CNT@m-SiO₂ sponges, including (a) N₂ adsorption-desorption isotherms, (b) Raman spectra, (c) wide-angle XRD patterns, and (d) tensile testing curves of the two samples, respectively.

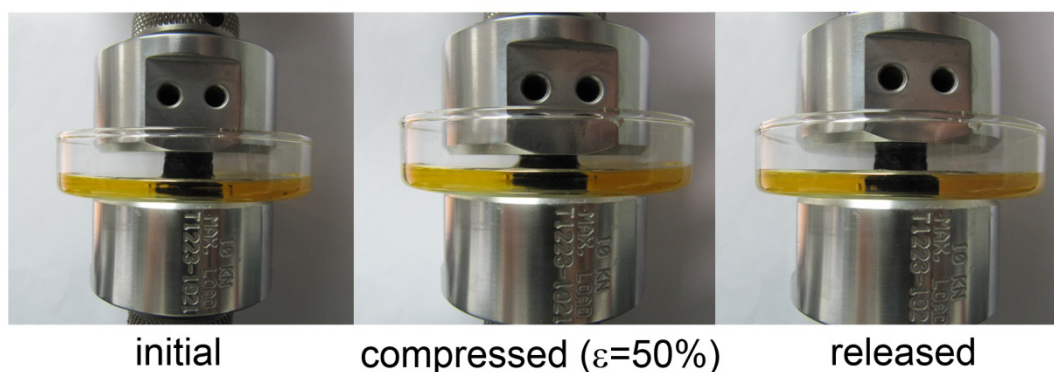


Figure S5. Dynamic adsorption setup. A bulk CNT@m-SiO₂ sponge (20 mg) was immersed in 10 mL MO solution in a dish placed on a stage in a mechanical testing instrument. The top stage was set to compress the sponge to ε=50% cyclically and fluid was pumped through the sponge constantly during the entire adsorption process.

