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## Supplementary information

# Nacre-inspired underwater superoleophobic films with high transparency and mechanical robustness

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# Supporting Information

# Nacre-inspired underwater superoleophobic films with high transparency and mechanical robustness

Wei Chen[1,2,3], Pengchao Zhang[4], Shaokang Yu[5], Ruhua Zang[1,3], Liming Xu[2], Shutao Wang[1,3*], Bailiang Wang[2*], Jingxin Meng[1,3*]

[1] CAS Key Laboratory of Bio-inspired Materials and Interfacial Science, Technical Institute of Physics and Chemistry, Chinese Academy of Sciences, Beijing 100190, P. R. China

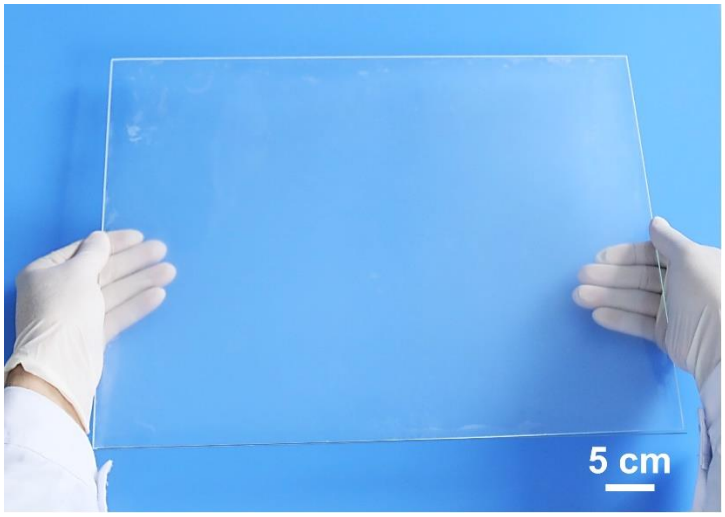
[2] School of Ophthalmology & Optometry, Eye Hospital, Wenzhou Medical University, Wenzhou 325027, P. R. China

[3] University of Chinese Academy of Sciences, Beijing 100049, P. R. China

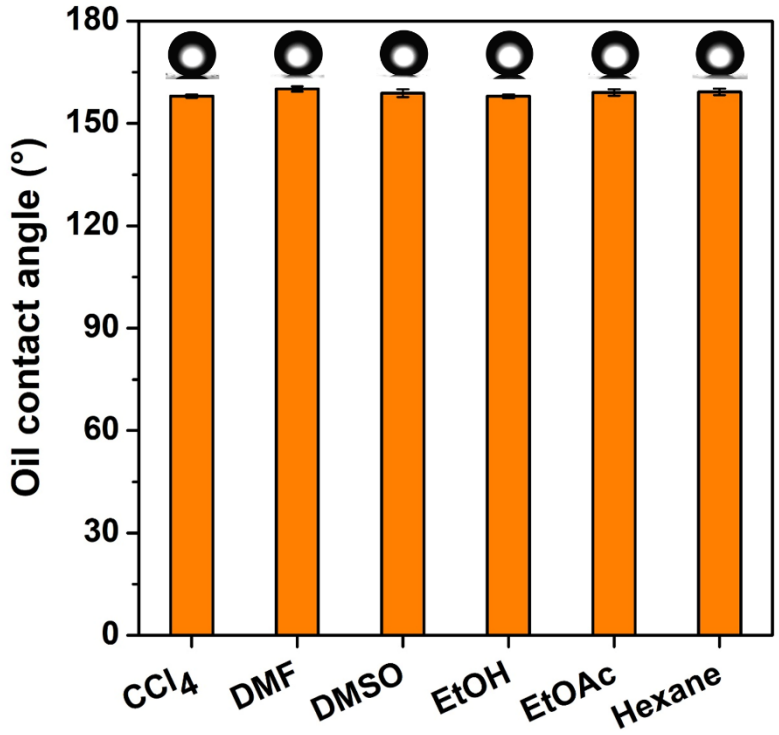
[4] School of Materials Science and Engineering, Key Laboratory of Advanced Technology for Materials Synthesis and Processing, Wuhan University of Technology, Wuhan 430070, China

[5] State Key Laboratory of Metastable Materials Science and Technology, Yanshan University, Qinghuangdao 066004, P. R. China.

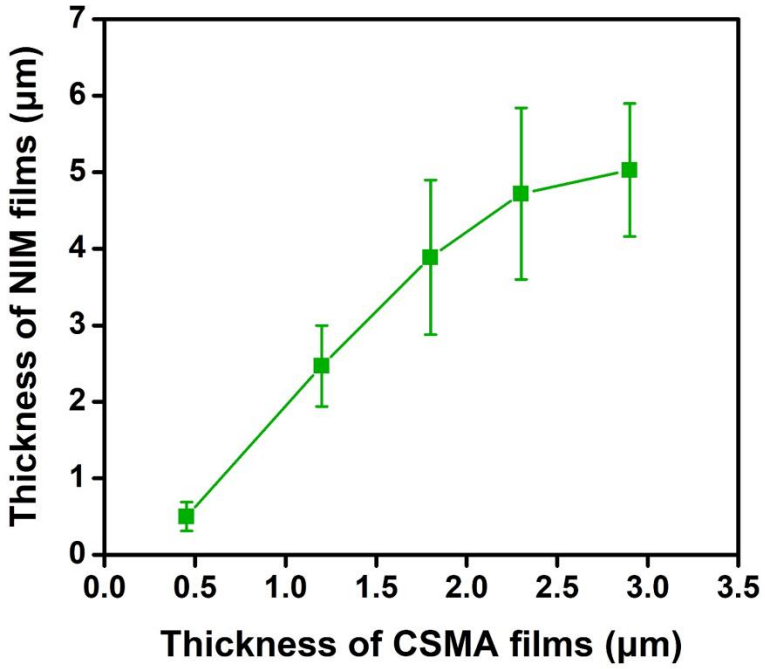
Correspondence should be addressed to S.W. (stwang@mail.ipc.ac.cn), B.W. (blwang@wmu.edu.cn) or J.M. (mengjx628@mail.ipc.ac.cn).



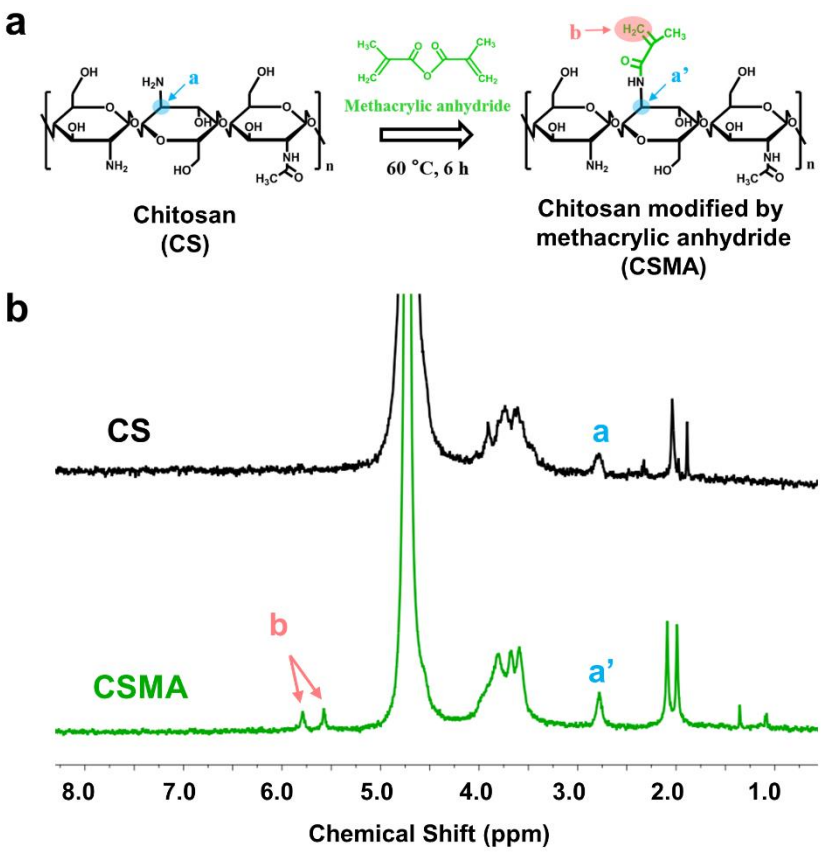

**Supplementary Fig. 1** Photograph of NIM film with a large-sized area of 30 cm × 40 cm.



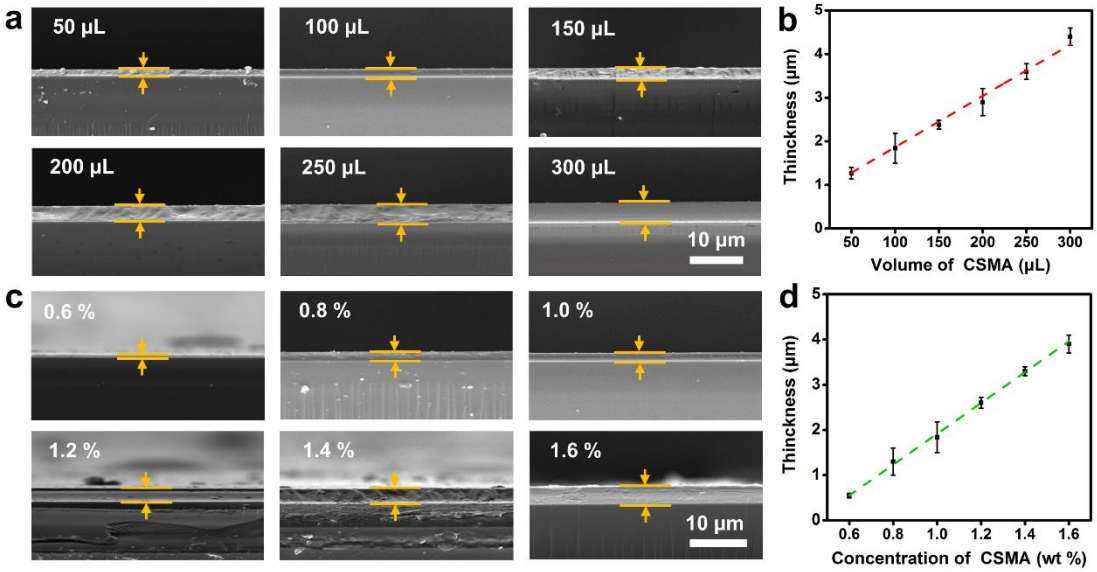

**Supplementary Fig. 2 Study of solvent resistance ability of the NIM film.** The underwater oil contact angles of the NIM film after immersing in various organic solvents for 24 h, including carbon tetrachloride ($CCl_4$), dimethylformamide (DMF), dimethyl sulfoxide (DMSO), ethyl alcohol (EtOH), ethyl acetate (EtOAc) and hexane.




**Supplementary Fig. 3 The thickness relationship between the NIM film and the CSMA film.** As the thickness of the CSMA film increases, the thickness of the mineralized film also increases.




**Supplementary Fig. 4 Synthesis and characterization of chitosan modified by methacrylic anhydride (CSMA).** (a) Highly chemoselective *N*-acylation reaction between chitosan (CS) and methacrylic anhydride (MA), thereby endowing CSMA with photo-crosslinkable ability by introducing double bonds. (b) $^{1}$H NMR spectra (400 MHz, $D_2O$) of CS and CSMA. The signals of vinyl protons around 5.57 & 5.79 ppm (b, 2H, $CH_2$), in which the peaks were labeled by red arrow, confirmed the covalent conjugation of methacryloyl groups to CS and unique chemical structure of CSMA. **a, b** adapted with permission from ref.[1], Wiley.




**Supplementary Fig. 5 The regulation of thickness of CSMA films.** a, c) SEM images of CSMA films with different thicknesses by regulating the volume and concentration of CSMA solution. b, d) The corresponding variation of film thickness with the volume or concentration of CSMA solution, which was fitting first order linear relation. **a-d** adapted with permission from ref.[1], Wiley.

## Reference

1 Chen, W. et al. Nacre-inspired mineralized films with high transparency and mechanically robust underwater superoleophobicity. *Adv. Mater.* **32**, 1907413 (2020).