Electronic Supplementary Material (ESI)

Oak-inspired anti-biofouling shape-memory unidirectional scaffold with stable solar water evaporation performance†

Hao Xu,[a] Hanye Xing,[a] Sheng Chen,[a] Qian Wang,[a] Liang Dong,[b] Kang-Di Hu,[a] Bao Wang,[c] Jingzhe Xue,*[a] and Yang Lu*[a]

a.School of Chemistry and Chemical Engineering, Anhui Province Key Laboratory of Advanced Catalytic Materials and Reaction Engineering, School of Food and Biological Engineering, Hefei University of Technology, Hefei, Anhui 230009, P. R. China. E-mail: yanglu@hfut.edu.cn. jzxue@hfut.edu.cn.

b.The Cancer Hospital of the University of Chinese Academy of Sciences (Zhejiang Cancer Hospital), Institute of Basic Medicine and Cancer (IBMC), Chinese Academy of Sciences, Hangzhou, Zhejiang 310022, China.

c.State Key Laboratory of Biochemical Engineering, Institute of Process Engineering, Chinese Academy of Science, Beijing, 100190, P. R. China

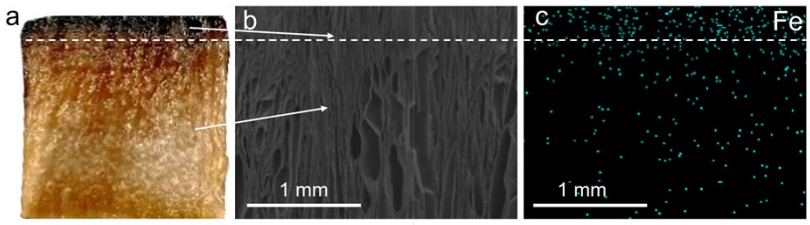

Fig. S1 (a) The digital photo, (b) SEM images and (c) EDS mapping images of Fe element of the longitudinal section of the oak-inspired unidirectional scaffold. Overall, high iron content could be found in the upper layer. In contrast, few iron distributed in the other sections.

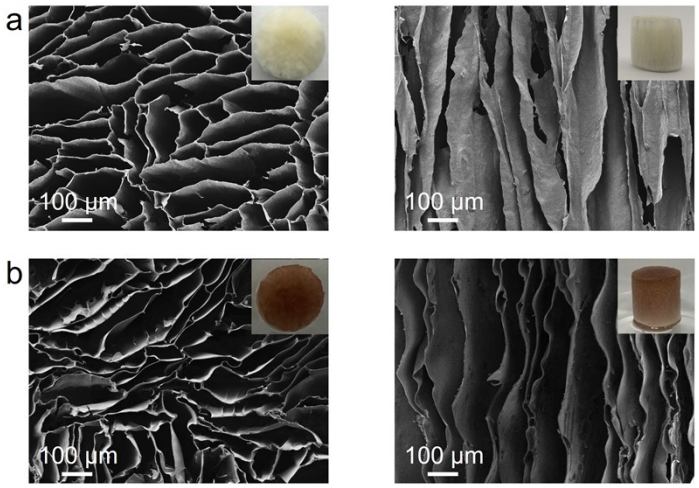

Fig. S2 SEM images of (a) the cross and longitudinal sections of the chitosan unidirectional scaffold, respectively; (b) the cross and longitudinal sections of the CTA unidirectional scaffold, respectively. The insert photos show of corresponding samples.

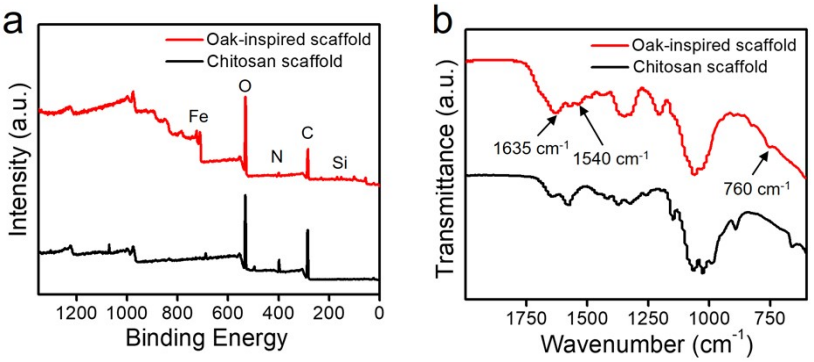

Fig. S3 (a) XPS and (b) FTIR spectra of oak-inspired and pure chitosan unidirectional scaffold

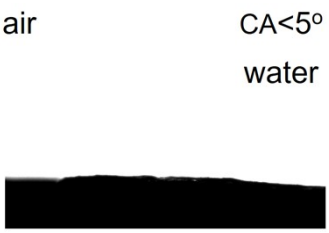

Fig. S4 The water contact angle images of the oak-inspired scaffold.

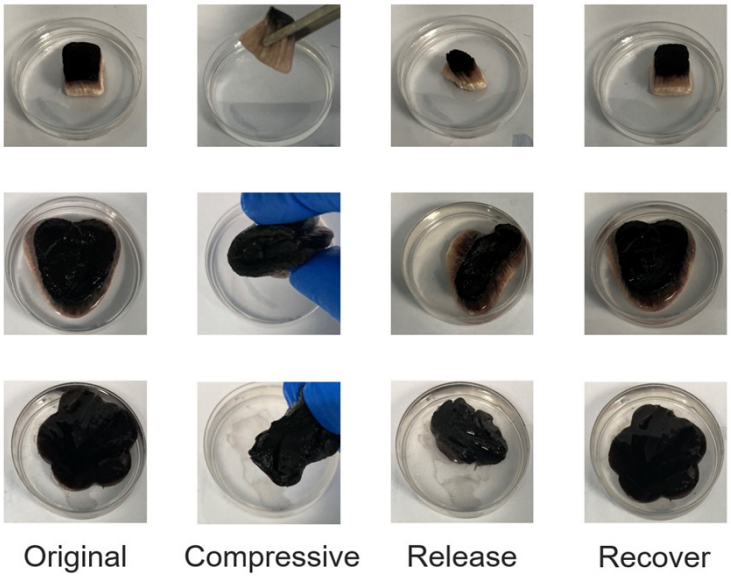

Fig. S5 The shape-memory property of the oak-inspired unidirectional scaffold in the water.

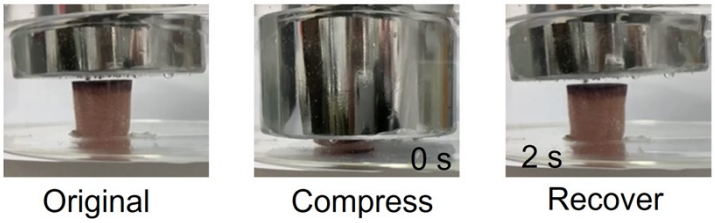

Fig. S6 The pictures of the oak-inspired unidirectional scaffold in the water before and after compression using a mechanical testing system.

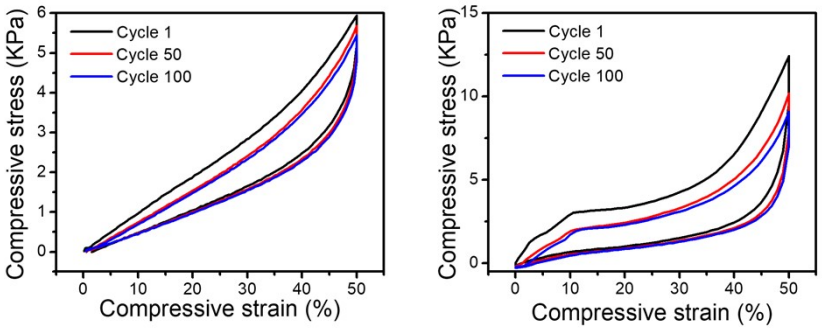

Fig. S7 Cyclic stress strain curves of the chitosan scaffold along the direction perpendicular and parallel to the channels for 100 compression cycles at a maximum strain of 50% in the water, respectively.

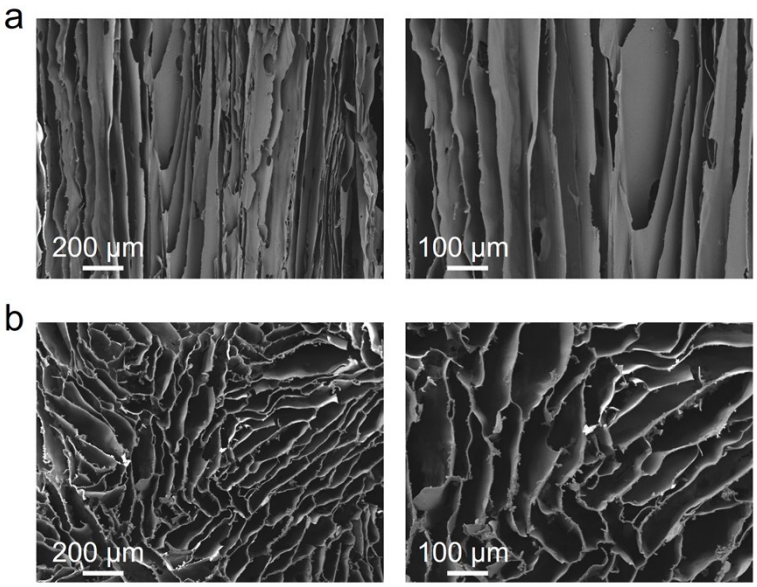

Fig. S8 SEM images of the (a) longitudinal axis and (b) cross axis of the oak-inspired unidirectional scaffold after 100 compression cycles in the water.

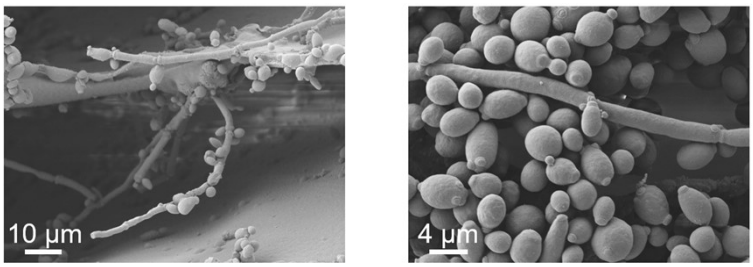

Fig. S9 The fungus on the chitosan scaffolds. The formation of mycelia is an effective way for *C.albicans* to obtain nutrients, and could continue to form networks which could promote the attachment of *C.albicans* onto various surface.

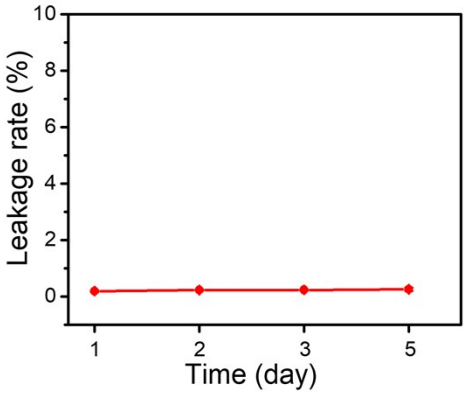

Fig. S10 The leakage rate of tannic acid in the oak-inspired scaffold in water for 5 days.

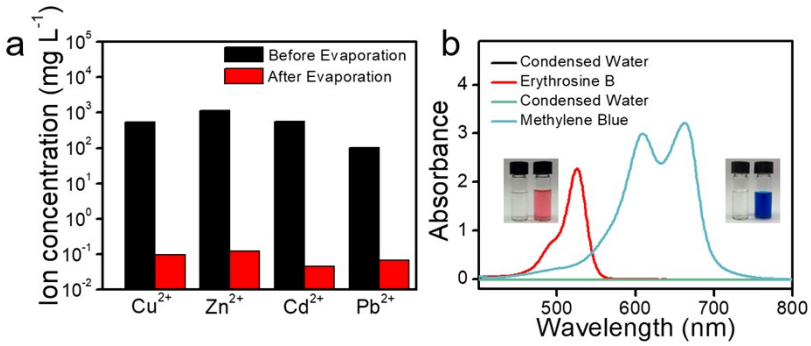

Fig. S11 (a) Concentrations of metal ions in a simulated sewage sample before and after desalination. (b) Purification of simulated sewage containing methylene blue and Erythrosine B, respectively, by solar evaporation with an oak-inspired unidirectional scaffold.

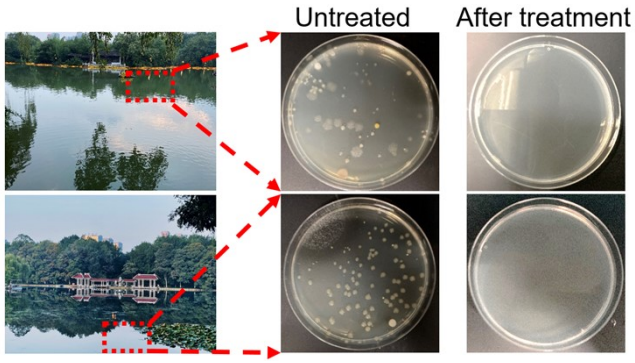

Fig. S12 Photographs of real pond for collecting the natural water, and the photos of agar plates indicate the count of microbials before and after solar evaporation.