

## Toward safe, efficient and multifunctional 3D blood-contact adsorbents engineered by biopolymers/graphene oxide gels

Ai He,<sup>a,1</sup> Bei Lei,<sup>a,1</sup> Chong (Sage) Cheng,<sup>\*a</sup> Shuang Li,<sup>a</sup> Lang Ma,<sup>a</sup> Shudong Sun,<sup>a</sup> and Changsheng Zhao<sup>\*a,b</sup>

<sup>a</sup> College of Polymer Science and Engineering, State Key Laboratory of Polymer Materials Engineering, Sichuan University, Chengdu 610065, China

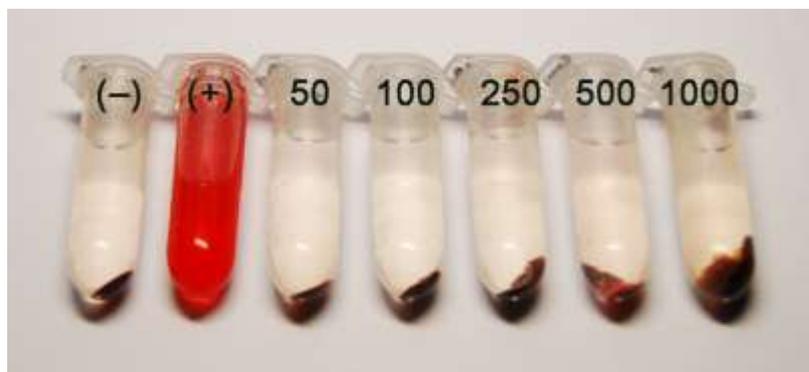
<sup>b</sup> National Engineering Research Center for Biomaterials, Sichuan University, Chengdu 610064, China

Tel: +86-28-85400453, Fax: +86-28-85405402, E-mail: sagecheng@163.com, zhaochsh70@163.com

<sup>1</sup> These two authors contribute equally to this work.

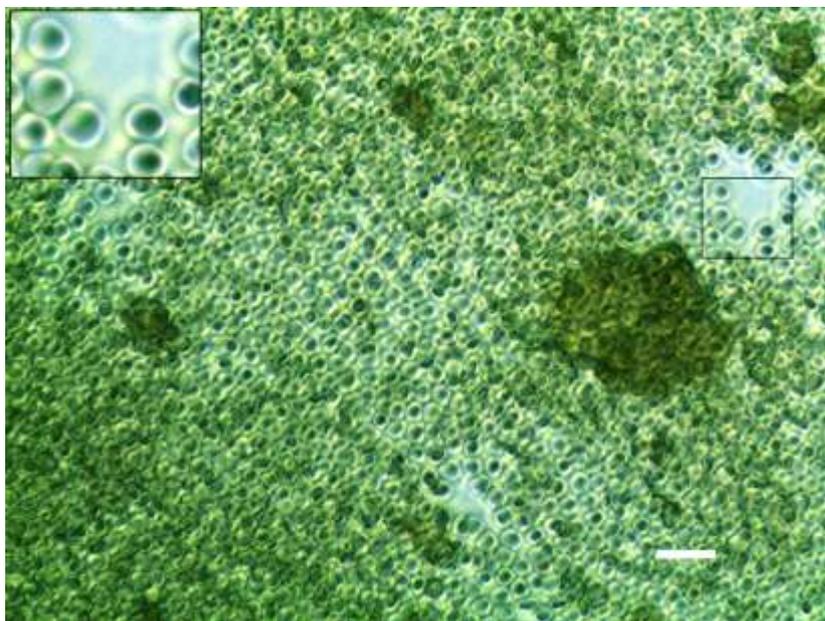


**Fig. S1** Photographs of the prepared 3D GO/biopolymer hydrogels and the gelation formation tests.

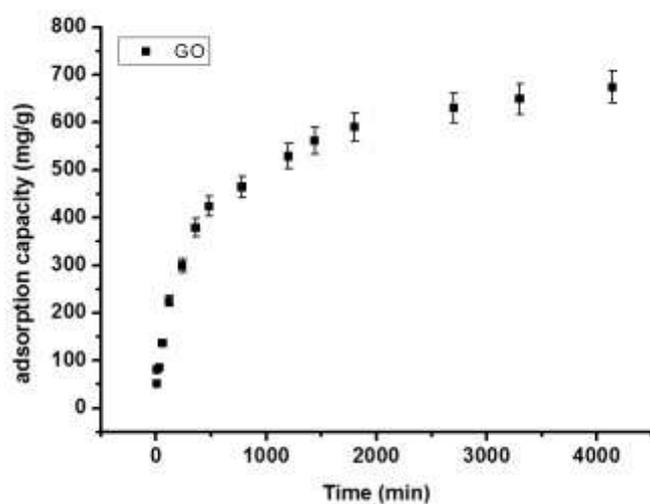


**Fig. S2** Photographs of human RBCs (right) after incubation with GO/CS (20mg GO,

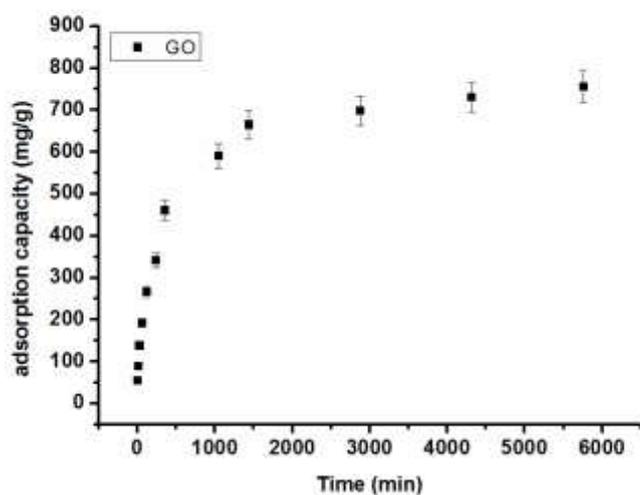
20 mg CS) for 3 h. The red solution indicated that the RBC was destroyed, and hemoglobin was released. (+) represents positive control and (-) represents negative control.



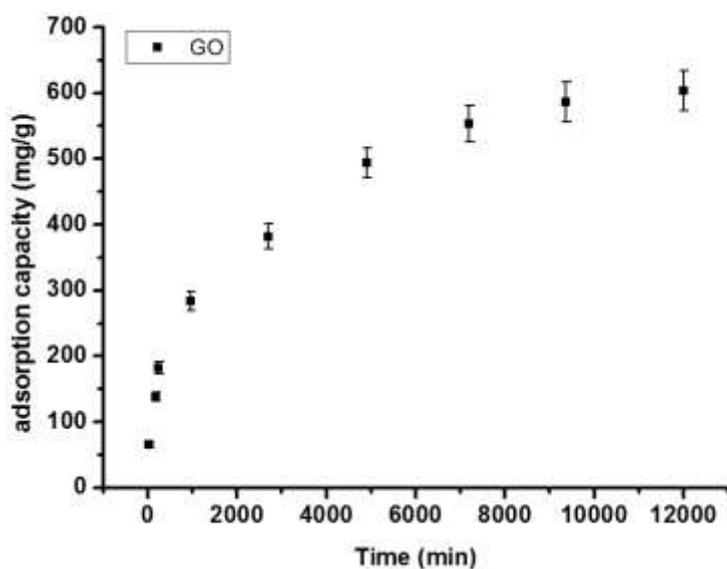
**Fig. S3** Optical microscope graphs of RBCs in the presence of GO/CS at 500 µg/mL at 37 °C with agitation for 3 h. White scale bars represent 20 µm. Inset images are magnified RBCs.



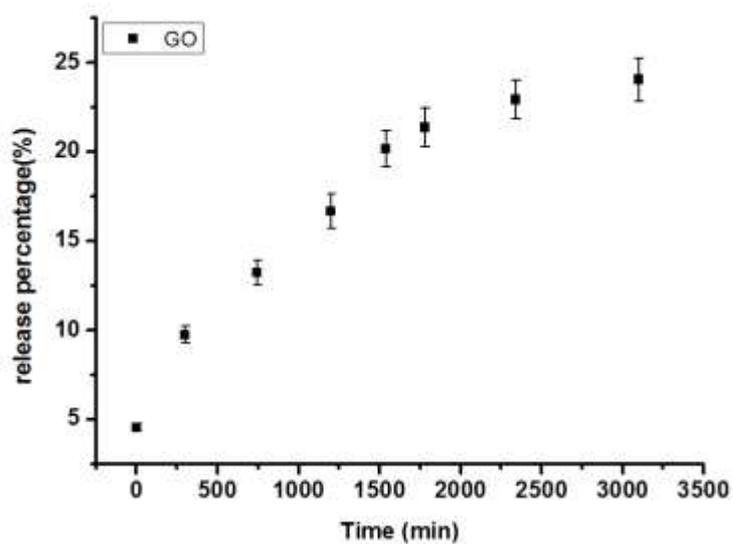
**Fig. S4** Time-dependent adsorption curves of MB for the GO sponge. Initial concentrations (0.1 mmol/L) in D.I. water at 25 °C.



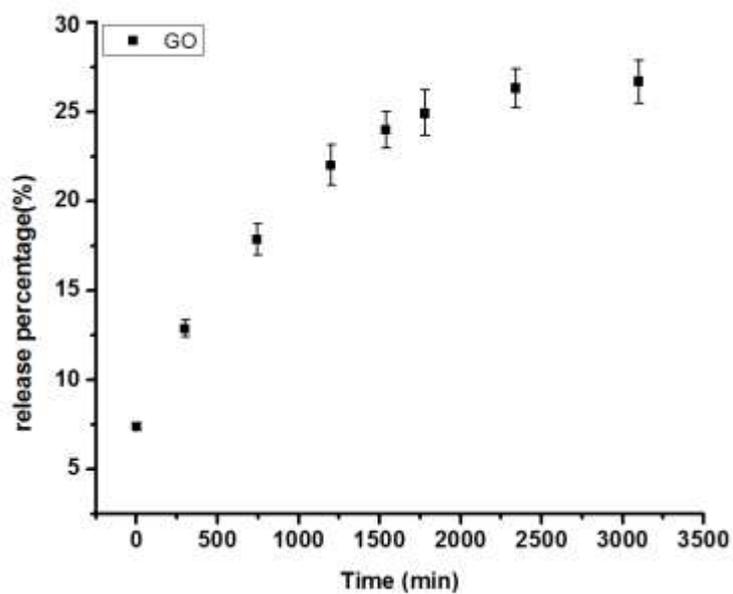
**Fig. S5** Time-dependent adsorption curves of MV for the GO sponge. Initial concentrations (0.1 mmol/L) in D.I. water at 25 °C.



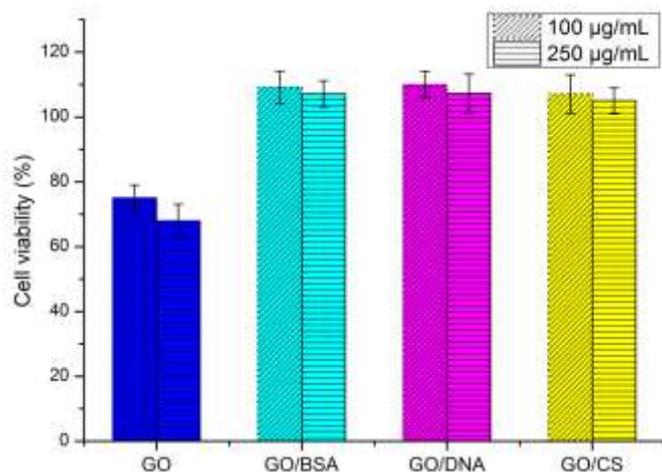
**Fig. S6** Time-dependent loading capacity of DOX for the GO sponge. Initial concentrations (0.1 mmol/L) in D.I. water at 25 °C.



**Fig. S7** Time-dependent release percentage (%) of DOX for the GO sponge in PBS (pH 7.4) at 25 °C.



**Fig. S8** Time-dependent release percentage (%) of DOX for the GO sponge in PBS (pH 5.5) at 25 °C.



**Fig. S9** Cell viability of human umbilical vein endothelial cells (HUVECs) determined from CCK-8 assay after exposed with different amounts of GO sponge and GO/biopolymers hybrid gels for 24 h. Values are expressed as means  $\pm$  SD,  $n = 4$ . The cell culture and viability tests are similar to an earlier report.[1] The results indicated that the GO/biopolymers hybrid gels exhibited better cell viability and low cytotoxicity than GO sponge.

[1] C. Cheng, S. Li, S. Nie, W. Zhao, H. Yang, S. Sun and C. Zhao, *Biomacromolecules*, 2012, 13, 4236-4246.