Supplementary Materials for

Physically cross-linked organo-hydrogels for friction interfaces in joint replacements: design, evaluation and potential clinical applications

Li Zheng[1†], Liang Yongzhi[2,3†], Wan Jia[4†], Zhu Wanbo[5], Wang Yingjie[6], Chen Yuan[6], Lu Baoliang[7], Zhu Junchen[6], Zhu Chen[2*] and Zhang Xianzuo[2*]*

[1] Department of Pharmacy, the First Affiliated Hospital of Anhui Medical University, Hefei, PR China

[2] Department of Orthopedics, The First Affiliated Hospital of USTC, Division of Life Sciences and Medicine, University of Science and Technology of China, Hefei, PR China

[3] School of Science, Harbin Institute of Technology, Shenzhen, PR China

[4] Department of Burns, the First Affiliated Hospital of Anhui Medical University, Hefei, PR China.

[5] Department of Orthopedics, Shanghai Jiao Tong University Affiliated Sixth People's Hospital, Shanghai Jiao Tong University, Shanghai, PR China.

[6] Department of Orthopedics, The Second Affiliated Hospital of Anhui University of Chinese Medicine, Hefei, PR China.

[7] Graduate School of Bengbu Medical College, Bengbu, PR China.

Corresponding Authors:

E-mail:2006zhujc@163.com (Zhu J.); zhuchena@ustc.edu.cn (Zhu C.); zhangxianzuo@ustc.edu.cn (Zhang X.)

This PDF files includes:

Figure S1-S7

Figures and Legends

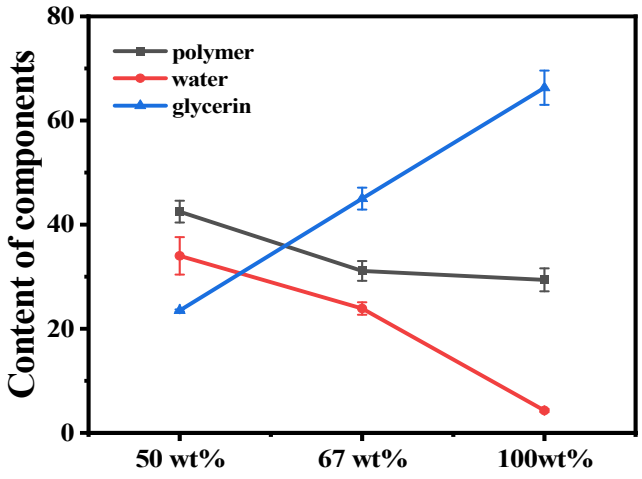

Figure S1. Content of polymer, water and glycerin for organohydrogels after soaking in glycerol solution with different concentrations.

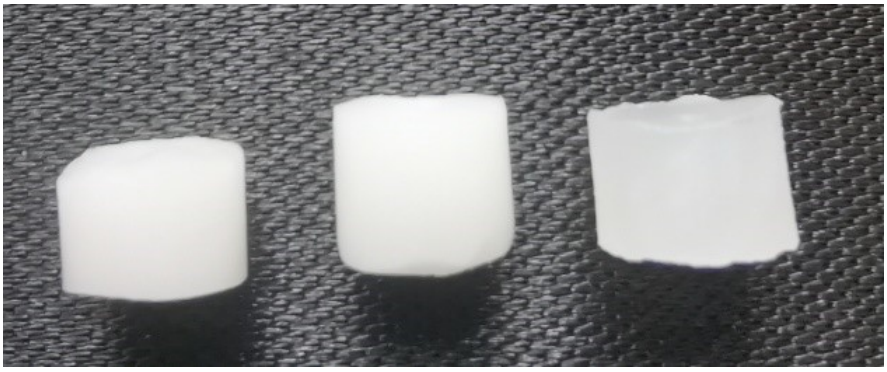

Figure S2. The picture of organohydrogel which has been soaking into 50wt% glycerin aqueous solution , 67wt% glycerin aqueous solution, and 100wt% glycerin.

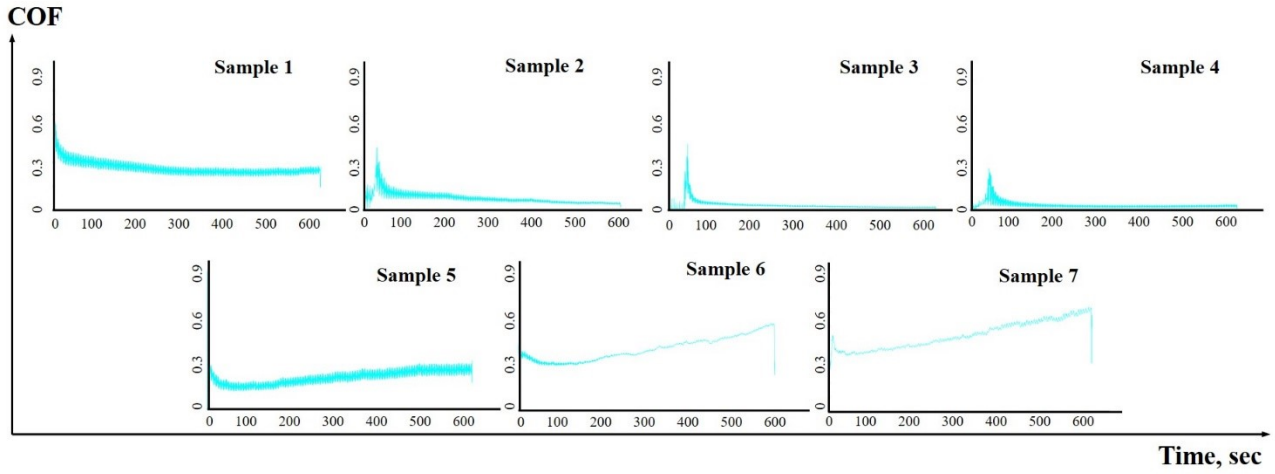

Figure S3. The curve COF changes by time for different samples subjected to friction tests at 0.2N. Sample 1-7 represent the different ratios of gel materials for the orthogonal design in Figure 5c.

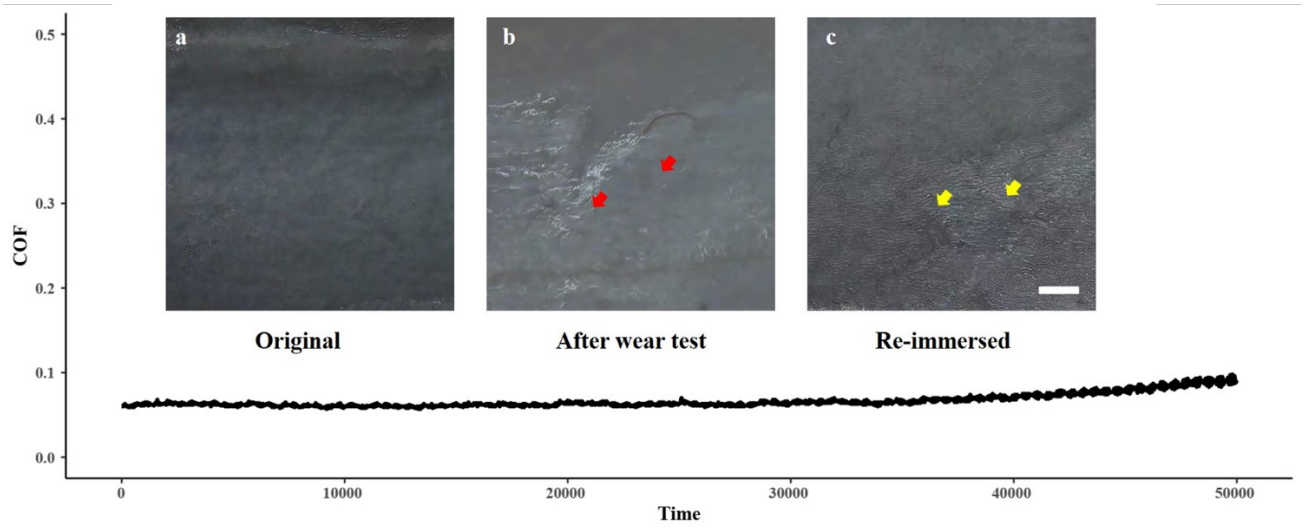

Figure S4. Representative pictures showing the surface appearance of the gel samples before the wear test, after rubbing for 600s and after the glycerine immersion again for 600s. (a) before friction test; (b) after 50,000 cycles of friction; (c) after 600s of glycerine re-impregnation. The red arrows show the swelling and abrasion of the gel following friction and the corresponding thermal effects. Yellow arrows show gel recovery after re-immersion. (Electron optical microscope, Scale bar=100 μm, magnification: 40×)

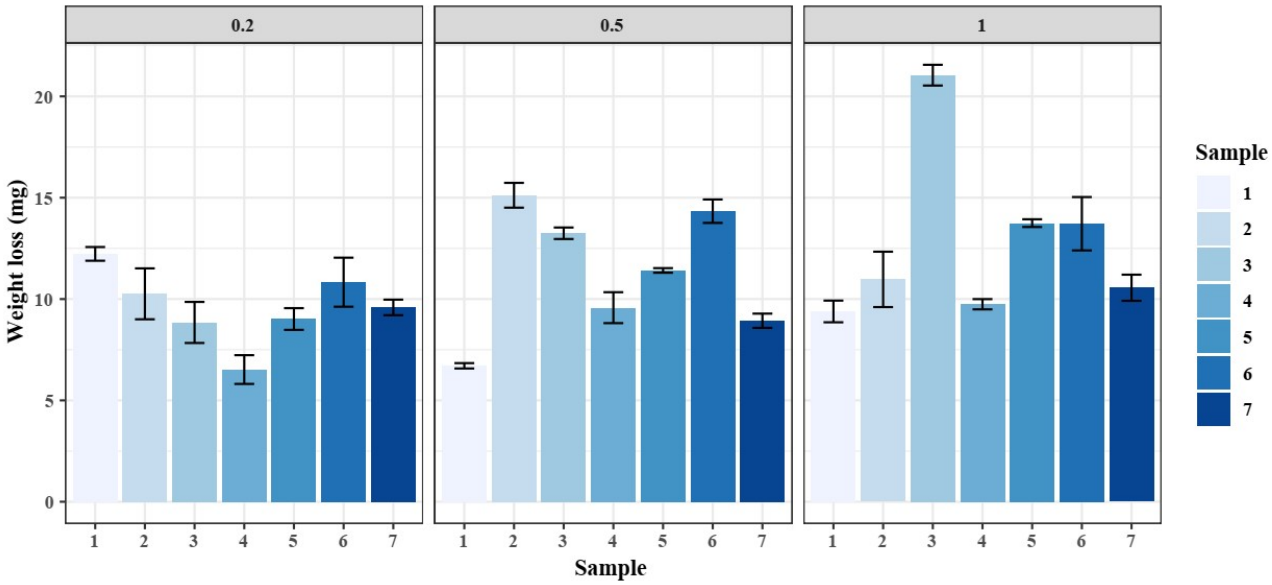

Figure S5. Mass loss of different samples after wear tests. Note: Referred weight loss includes loss of liquid weight.

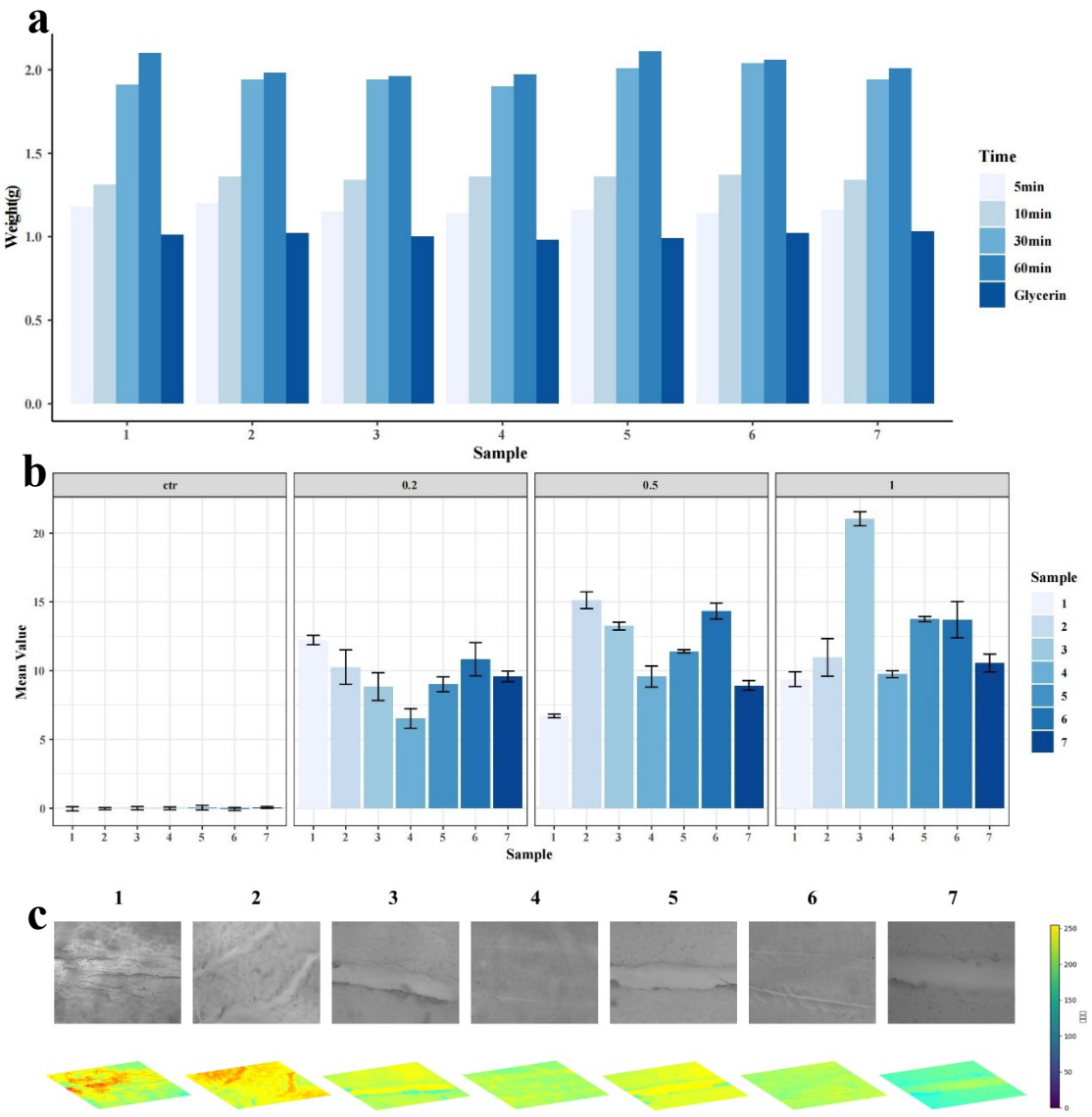

Figure S6. (a) Weight of all the gels after immersion in abundant saline for 5, 10, 30, and 60 minutes. (b) Mean value of gels after immersion in normal saline for the same duration as the friction test. (c) Microscopic examination for surface changes after friction.

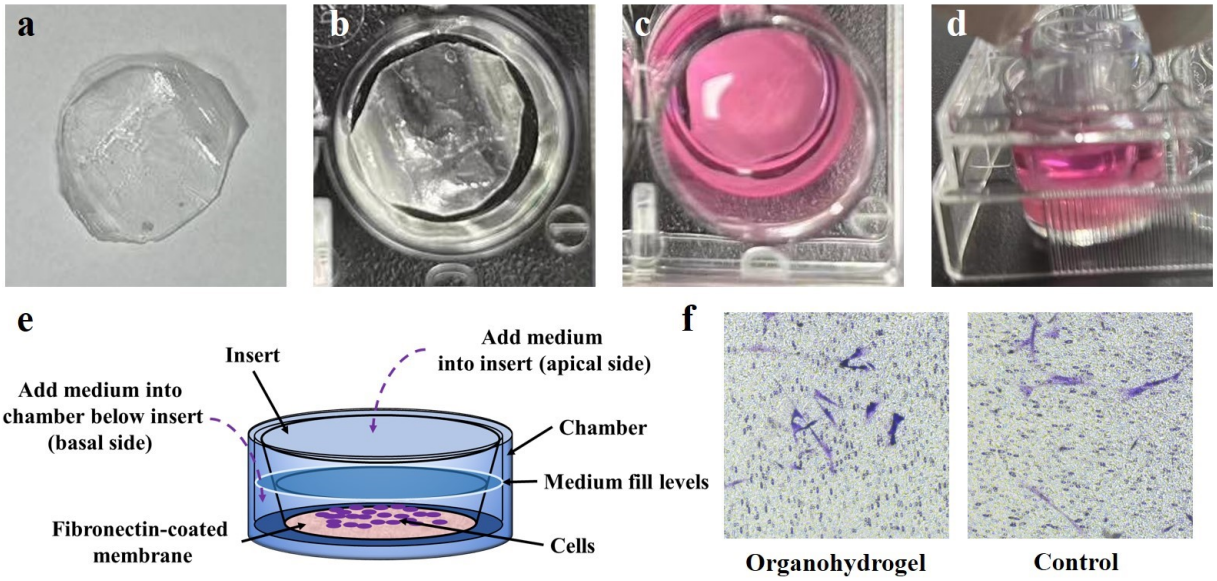

Figure S7. Cell migration capacity measured using the Transwell technique. (a) a typical Transwell chamber. (b) a Transwell chamber was placed in the culture wells of a 96-well plate. (c) Organohrydrogel and cell culture medium were placed in the culture wells of a 96-well plate. (d) Place Transwell chambers in the 96-well plate and cells are cultured in the chambers. (e) Diagram of Transwell culture cells. (f) Typical example of cell migration in co-culture with Organohrydrogel and control.