

# Supplementary data

## **A Green Pathway to Adjust the Mechanical Properties and Degradation Rate of PCL by Blending Bio-sourced Poly (Glycerol-Succinate) Oligoesters**

Guang-Zhong Yin <sup>a, c, \*, #</sup>, Xiao-Mei Yang <sup>b, #</sup>, Zheng Zhou <sup>a</sup>, Qi-Fang Li <sup>a, \*</sup>

<sup>a</sup> College of Chemistry and Molecular Engineering, Peking University, Beijing 100871, P. R. China

<sup>b</sup> National Laboratory of Flame Retardant Materials, Beijing Institute of Technology, Beijing 100081, P. R. China

<sup>c</sup> State Key Laboratory of Chemical Resource Engineering, Beijing University of Chemical Technology, Beijing 100029, China

<sup>#</sup> The authors contributed equally to the work.

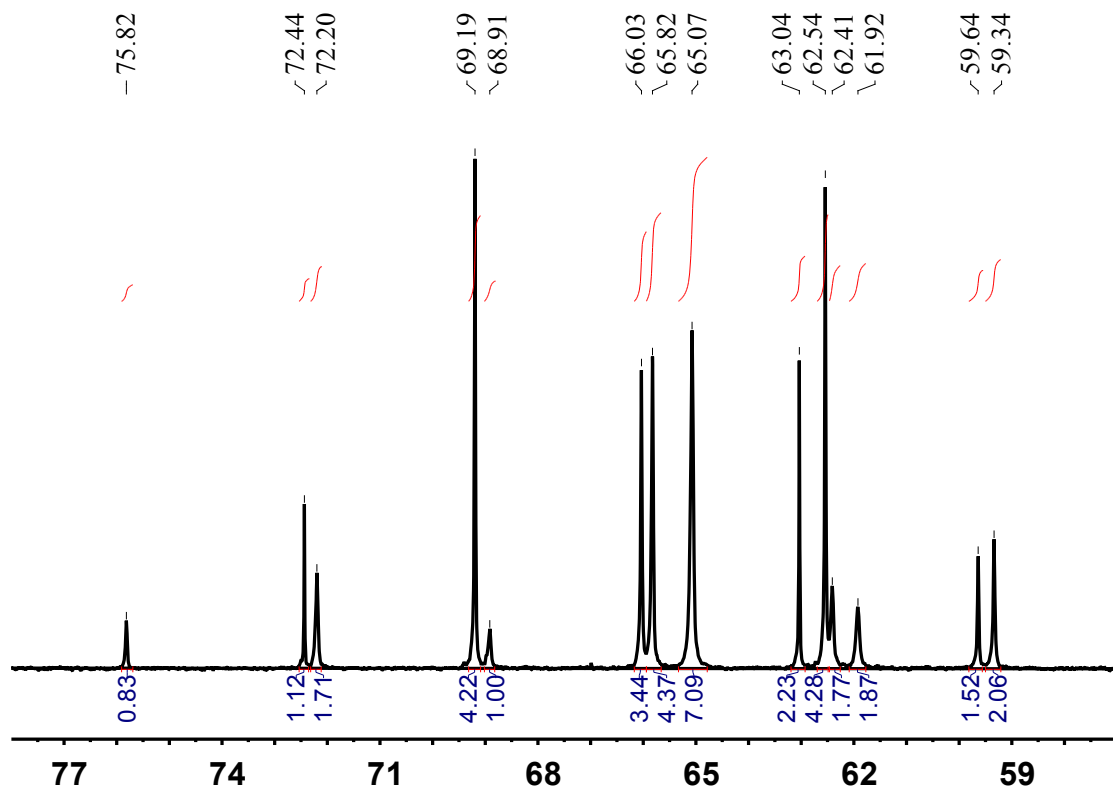
**Corresponding Authors:** Dr. Guang-Zhong Yin, E-mail: [yingzh@pku.edu.cn](mailto:yingzh@pku.edu.cn); Prof.

Qi-Fang Li, E-mail: [qflee@mail.buct.edu.cn](mailto:qflee@mail.buct.edu.cn).

**S1. The detailed calculation of  $DB_{Frey}$  and  $DP_{n, Frey}$**

$$DB_{Frey} = \frac{2D}{2D + L} = \frac{2D}{2D + L_{1,2} + L_{1,3}} = \frac{5.74}{5.74 + 1.71 + 1.77 + 2.06 + 3.44 + 7.09} = 0.263$$

$$DP_{n, Frey} = \frac{D + L + T}{T - D} = \frac{D + L_{1,2} + L_{1,3} + T_G + T_{1,3}}{T_G + T_{1,3}} = \frac{2.87 + 1.71 + 1.77 + 2.06 + 3.44}{4.22 + 4.37} = 2.244$$



**Figure S1.** The chemical shift assignments of the glycerol carbons for glycerol and the 5 ester species

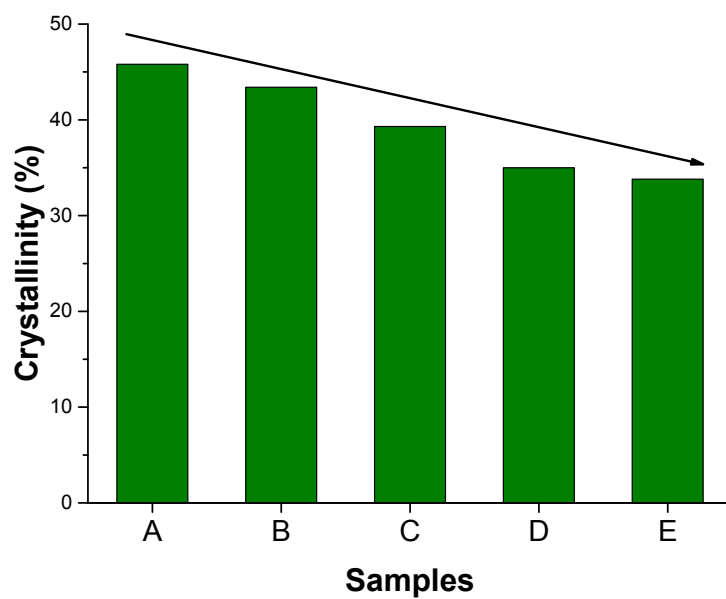


Figure S2. The Crystallinity trends according to DSC results.

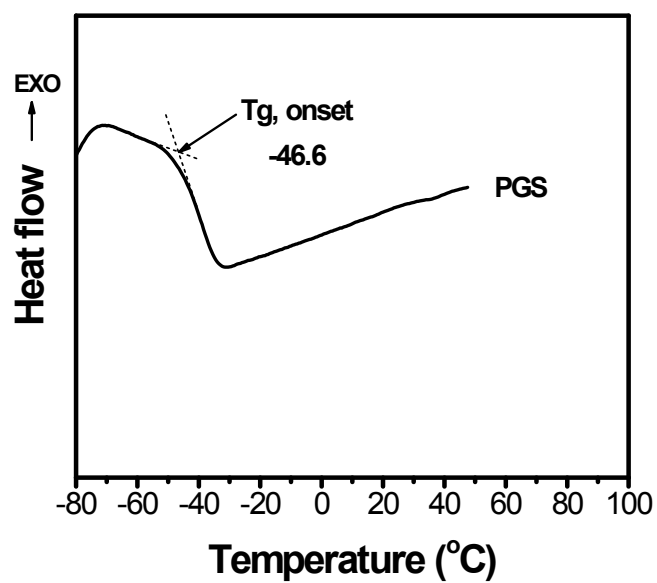
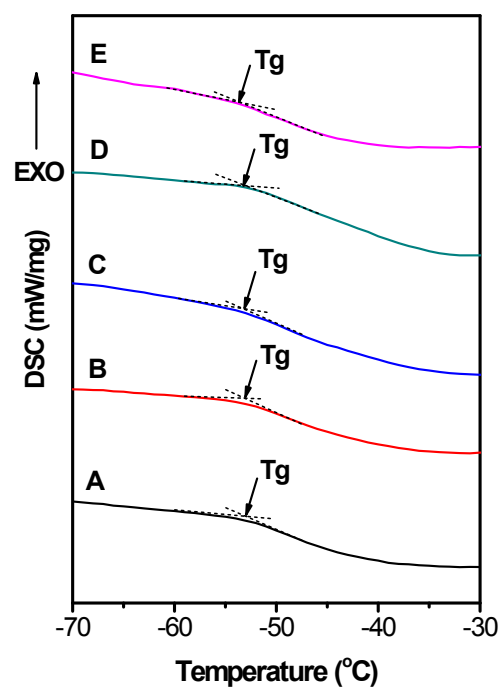
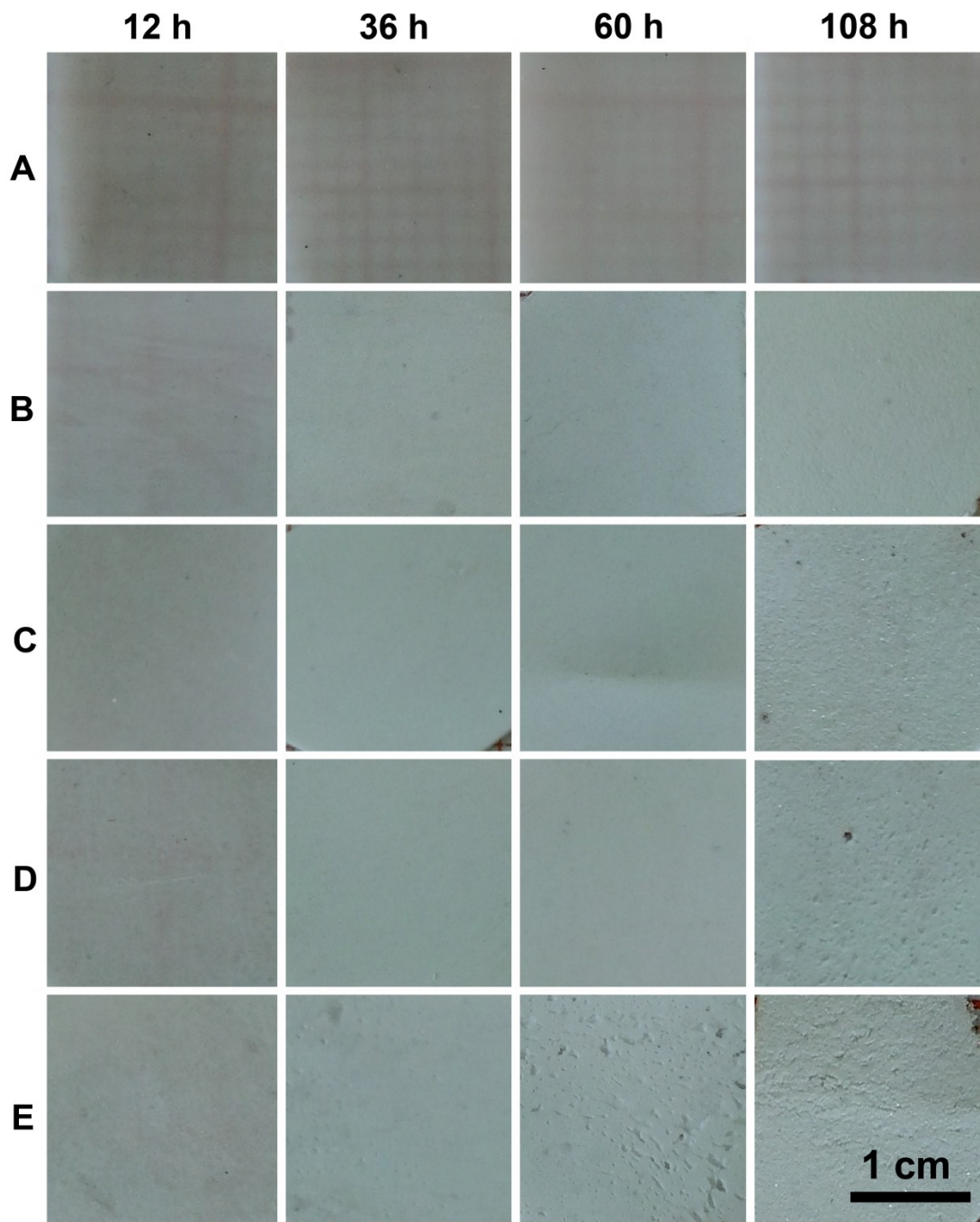


Figure S3. DSC curve of PGS



**Figure S4.** Enlarged T<sub>g</sub> regions of DSC curves.



**Figure S5.** Surface images of PCL and PCL/PGS blends membrane after hydrolysis with different time. All the scale bar are 1 cm.