

Fabrication of glycidyl methacrylate-modified silk fibroin/poly(L-lactic acid-co- ϵ -caprolactone)–polyethylene glycol diacrylate hybrid 3D nanofibrous scaffolds for tissue engineering

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Supplementary material

1 Fabrication of SFMA/P(LLA-CL) (8:2) 2D nanofibrous membranes

8 wt.% SFMA/P(LLA-CL) blend solution was obtained through a certain amount of SFMA and P(LLA-CL) at a weight ratio of 8:2 dissolving in HFIP for 12 h and then electrospun according to following parameters: the applied voltage, the flow rate, and the collection distance were set at 14 kV, 1.5 mL·h⁻¹, and 15 cm, respectively.

2 Measurement on values of the swelling water rate (SWR) and the dissolved weight ratio (DWR)

The hybrid 3D nanofibrous scaffolds were soaked in deionized water at 37 °C for different time and then were collected at a set interval. The unabsorbed water was drawn with filter paper. The weights of swelling and dried nanofibrous scaffolds were recorded as M_t and M_0 , respectively. The swelling water rate (SWR) was calculated by the following equation, in which each value was averaged from triplicate specimens:

$$\text{SWR}/\% = \frac{M_t - M_0}{M_0} \times 100 \quad (\text{S1})$$

After 24 h of water absorption, the samples were freeze-dried, and then weighted as M_d . The dissolved weight ratio (DWR) was calculated by the following equation:

$$\text{DWR}/\% = \frac{M_0 - M_d}{M_0} \times 100 \quad (\text{S2})$$

3 Examination of mechanical properties of SFMA/P(LLA-CL)–PEGDA hybrid 3D nanofibrous scaffolds

Mechanical properties of 3D nanofibrous scaffolds were evaluated in a wet state. All samples were soaked in phosphate-buffered saline (PBS) for 30 min and the surface water was drawn with filter paper before testing. The mechanical properties of hybrid 3D nanofibrous scaffolds were measured using a material testing machine (H5K-S, Hounsfield, England). The data averaged by 5 parallel samples. The tensile and compressive properties of 3D nanofibrous scaffolds were measured at an elongation speed of $10 \text{ mm} \cdot \text{min}^{-1}$ and at a compressive speed of $10 \text{ mm} \cdot \text{min}^{-1}$, respectively. The compressive distance was 80% of the thickness of 3D nanofibrous scaffolds. The Young's moduli were calculated analytically using the slope fitting method in the initial linear region of the stress-strain curve.

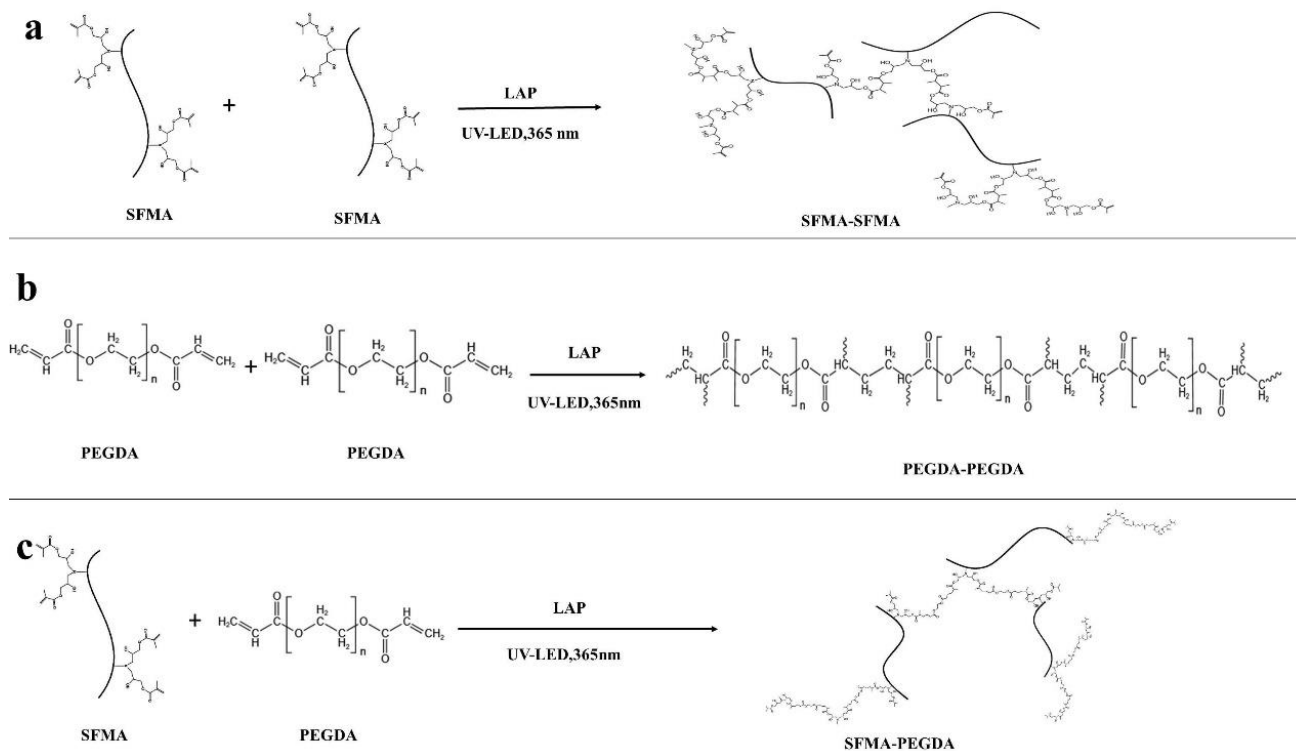


Fig. S1 The schematic of three kinds of crosslinking polymerization reactions: (a) SFMA–SFMA; (b) PEGDA–PEGDA; (c) SFMA–PEGDA.

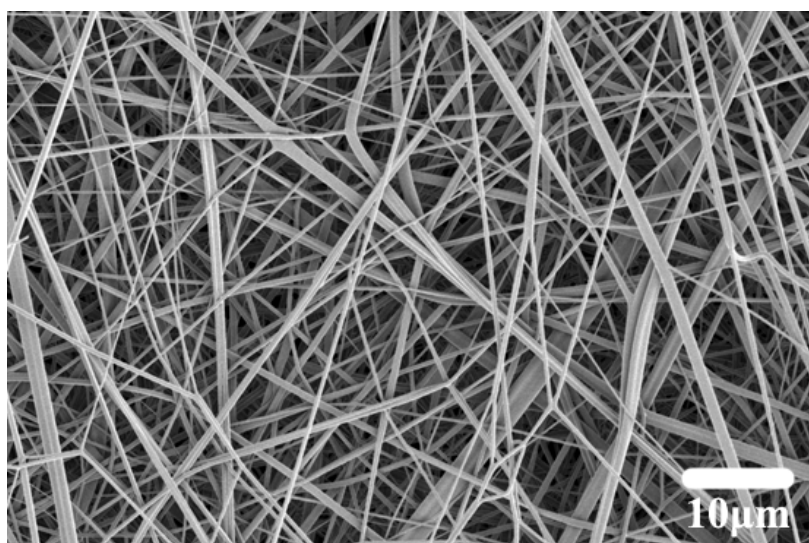


Fig. S2 SEM image of SFMA/P(LLA-CL) nanofibrous membranes.