Supporting Information

RhBMP-2 loaded MBG/PEGylated poly(glycerol sebacate) composite scaffold for rapid bone regeneration

Yanjun Chai[1,3], Dan Lin[2,3],Yifan Ma [1,3],Yuan Yuan[1, 3]*, and Changsheng Liu[1,2,3]*

[1] *The State Key Laboratory of Bioreactor Engineering, East China University of Science and Technology, Shanghai 200237, PR China*

[2] *Key Laboratory for Ultrafine Materials of Ministry of Education, East China University of Science and Technology, Shanghai 200237, PR China*

[3]*Engineering Research Center for Biomaterials of Ministry of Education, East China University of Science and Technology, Shanghai 200237, PR China*

***Corresponding Author**

E-mail address:

yyuan@ecust.edu.cn (Yuan Yuan); liucs@ecust.edu.cn (Changsheng Liu)

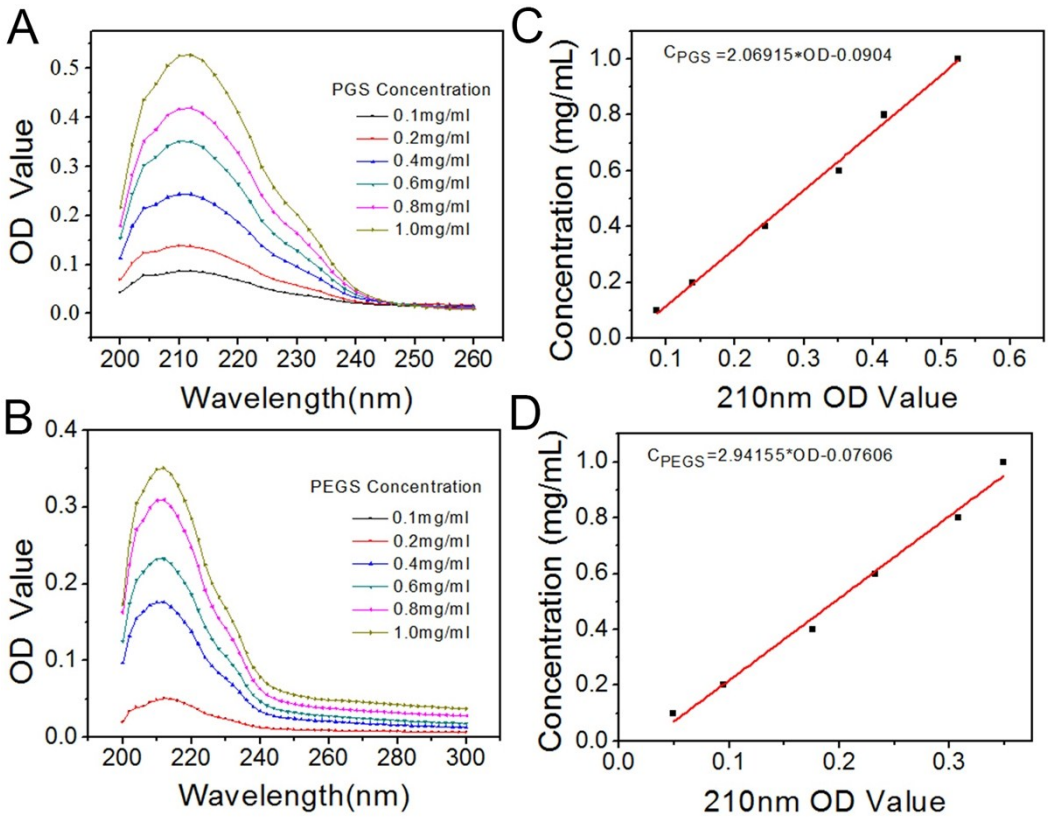

Fig. S1. (A, B) Concentration-dependent ultraviolet absorption spectra of PGS and PEGS solution and (C, D) the corresponding linear fitting equation. The UV adsorption around 210 nm came from carboxyl group and was irrelevant to the polymer molecular weight. The dissolved PGS/PEGS concentrations of degradation liquor at different times were calculated by measuring 210 nm OD value, and converted to the mass of degraded PGS/PEGS coating.

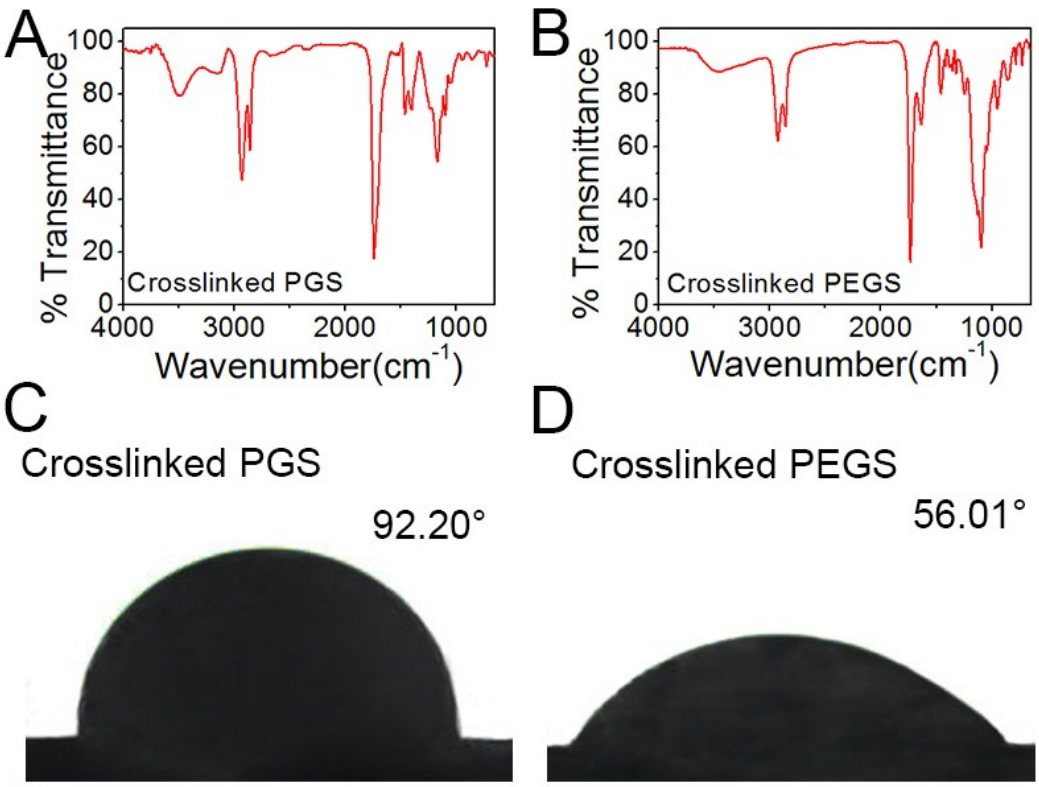

Fig. S2. (A, B) FTIR spectra of crosslinked PGS and crosslinked PEGS. Comparing to uncrosslinked polymers (Fig. 2E-F), FTIR spectra of both crosslinked polymers exhibited significantly smaller absorption peak of O-H at wavenumber of 3460 cm^{-1}. (C, D) Contact angles of crosslinked PGS and crosslinked PEGS coating on planar MBG flakes. Crosslinked PGS showed a definite hydrophobicity with the contact angle of 92.20°, while crosslinked PEGS with the contact angle of 56.01° was still in the range of hydrophilic biomaterials.

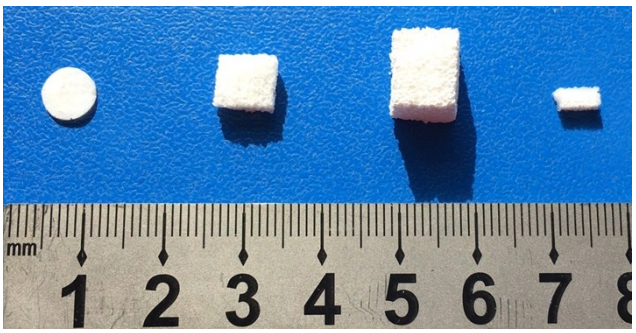

Fig. S3. Planar flakes and porous scaffolds with different sizes and shapes for different experiments. Detailed parameters of sizes and shapes of the materials see Table S1.

Table S1. Sizes and shapes of materials, scaffold weights, as well as rhBMP-2 immobilization amount for different experiments.

Scaffold structures	Shapes and sizes (mm)	Scaffold weight (mg)	Experiments	RhBMP-2 amount (μg)
Non-porous flakes	Cylinder Φ10*1	/	• Contact angle measurement • *In vitro* cell adhesive morphology observation	/
Porous scaffolds	Cubes 10*10*3	50 ± 1.1	• Material degradation • *In vitro* cytotoxicity, cell proliferation • *In vitro* osteogenic differentiation	/
	Cubes 10*10*10	200 ± 4.5	• Compressive tests	/
	Cylinder Φ2*5	20 ± 0.5	• RhBMP-2 release profiles • *In vivo* ectopic bone formation	5

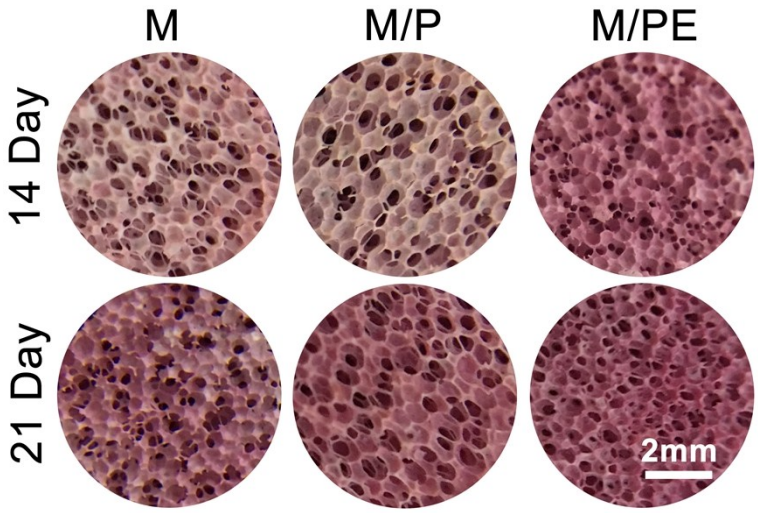

Fig. S4. Digital photos of the Alizarin red staining of scaffolds. Deepest staining color was observed on the M/PE scaffold.

Table S2. Primer sequences used in real-time quantitative reserve transcription-polymerase chain reaction (RT-qPCR).

Primer	Sequences
Runx2-for	ATCCAGCCACCTTCACTTACACC
Runx2-rev	GGGACCATTGGGAACTGATAGG
Col I-for	TGGATGGCTGCACGAGT
Col I-rev	TTGGGATGGAGGGAGTTTA
ALP-for	CGGAAGTGAGGCAGGTAG
ALP-rev	AGAGCCCACAATGGACAG
OCN-for	GCCCTGACTGCATTCTGCCTCT
OCN-rev	TCACCACCTTACTGCCCTCCTG
OPN-for	CCAAGCGTGGAAACACACAGCC
OPN-rev	GGCTTTGGAACTCGCCTGACTG
Col2a1-for	GACTTTCCTCCGTCTACTGTCC
Col2a1-rev	GTGTACGTGAACCTGCTGTTG
Acan-for	ACTGAAGGACAGGTTCGAGTG
Acan-rev	CACACCGATAGATCCCAGAGT
β-actin-for	CACCCGCGAGTACAACCTTC
β-actin-rev	CCCATACCCACCATCACACC