Electronic Supplementary Material (ESI) for Materials Advances.

SUPPLEMENTARY MATERIAL

Elaboration and mechanical properties of elastomeric fibrous scaffolds based on crosslinked poly(glycerol sebacate) and cyclodextrin for soft tissue engineering

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Note: the authors declare no competing financial interest.

NMR analysis of pPGS:

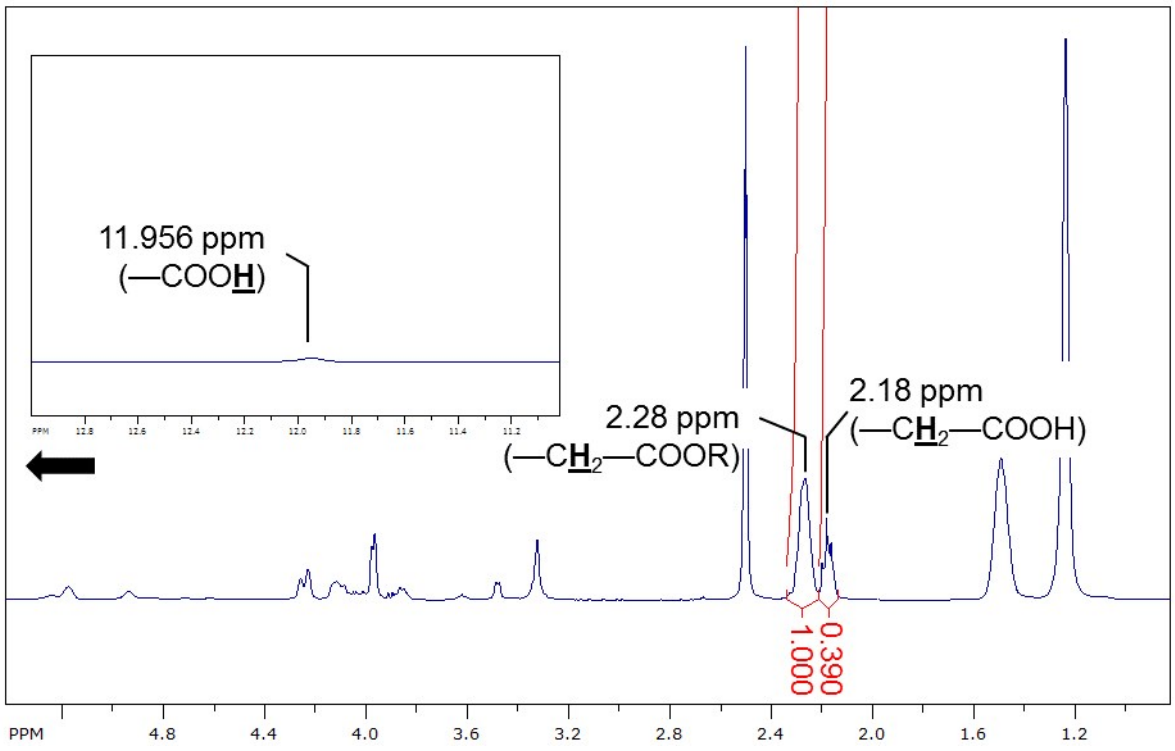

Figure S1. ^{1}H NMR spectrum of pPGS in d-DMSO.

Plasticizing effect of pPGS on PVP:

When using pure PVP as carrier polymer, a high amount of PVP is necessary and continuous fiber are obtained only for pPGS/PVP 30/70 (Figure S2). At lower PVP amounts, the jet was instable and droplets of solution cover the fibrous scaffold making it look as a film (Figure 2). Moreover, despite the high T_g of PVP (180°C), pPGS/PVP 30/70 electrospun fibers melted during crosslinking process at 140°C (Figure S2). This could be explained by a plasticizing effect of PVP by pPGS: a decrease of the T_g of PVP to 83°C was indeed measured by DSC on pPGS/PVP 30/70 electrospun nanofibers (Figure S3). Therefore, PVP alone is not a good carrier polymer for pPGS. HPβCD, with a high degradation temperature (278°C), is thus required to keep the fibrous structure during curing and to stabilize the electrospinning process.

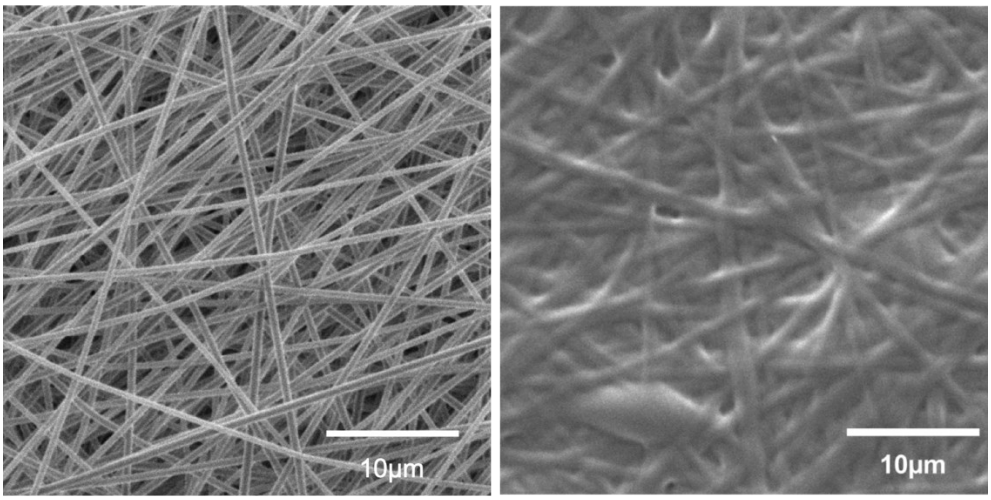

Figure S2. SEM picture of an electrospun sample with 30% of pPGS and 70% of PVP as spun and after heating at 140°C.

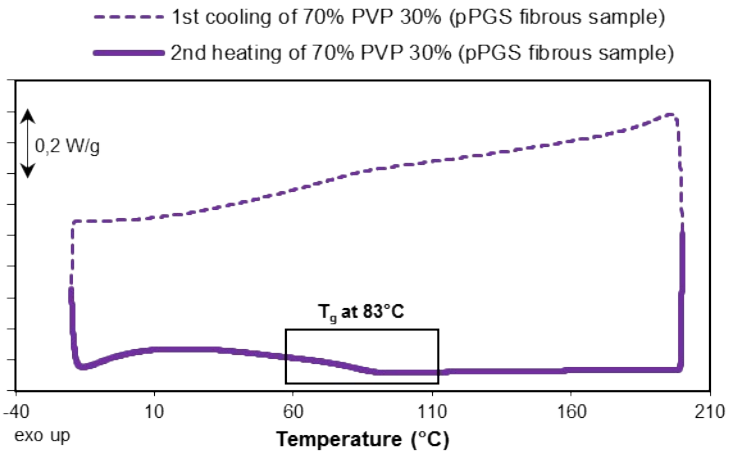

Figure S3. Thermogram obtained by DSC (heat-cool-heat cycle at 3°C/min under N_2 atmosphere) for a sample of electrospun fibers fabricated from a solution with 3% of pPGS and 7% of PVP in DMF/Ethanol 3/7.

Morphology of electrospun fibers:

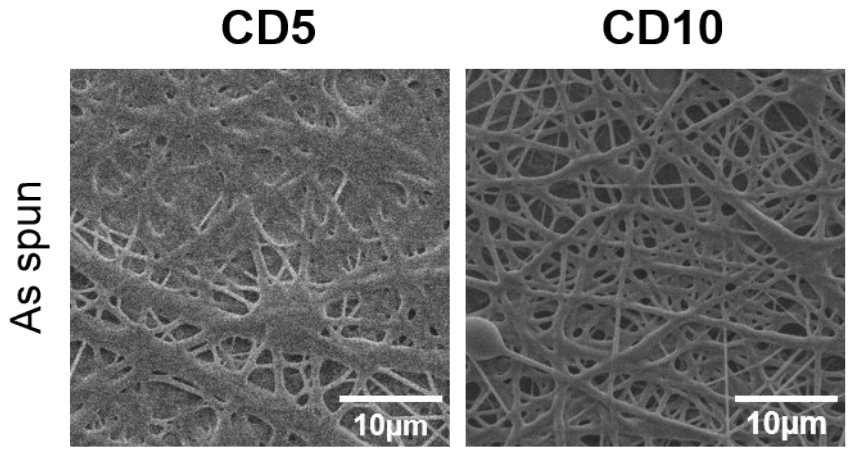

Figure S4. SEM pictures of as-spun samples with 50% of pPGS, 5% of HPβCD and 45% of PVP (**CD5**) or with 50% of pPGS, 10% of HPβCD and 40% of PVP (**CD10**). Samples were obtained after electrospinning of solutions with 13 wt% of solid in DMF/ethanol 3/7.

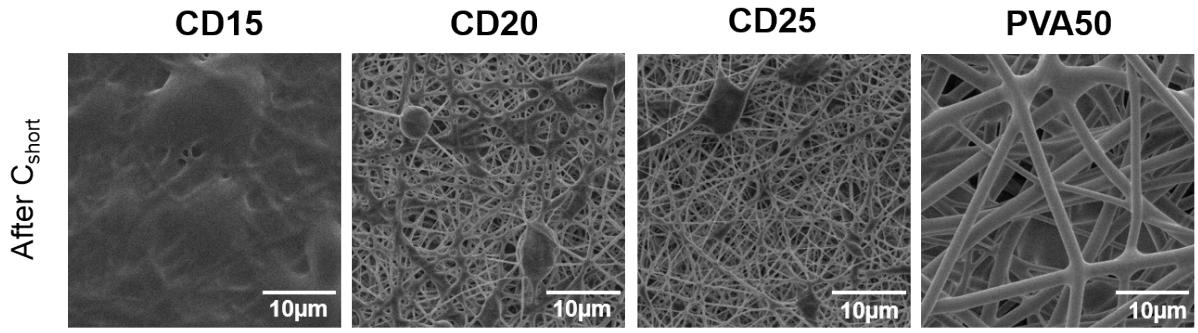

Figure S5. SEM pictures of fibrous scaffolds composed of 50% of PGS, 15% of HPβCD and 35% of PVP (**CD15**), 50% of PGS, 20% of HPβCD and 30% of PVP (**CD20**), 50% of PGS, 25% of HPβCD and 25% of PVP (**CD25**), or 50% of pPGS and 50% of PVA (**PVA50**) after the following curing step under vacuum: 24h at 120°C and 48h at 140°C.

Infra-red supplementary curves:

For CD25:

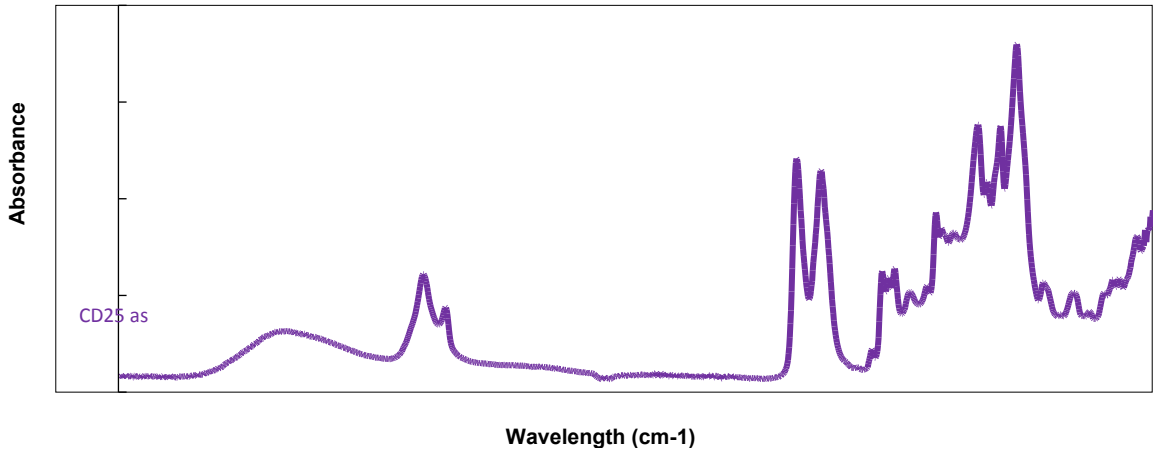

Figure S6. Infra-red spectra for CD25 as spun.

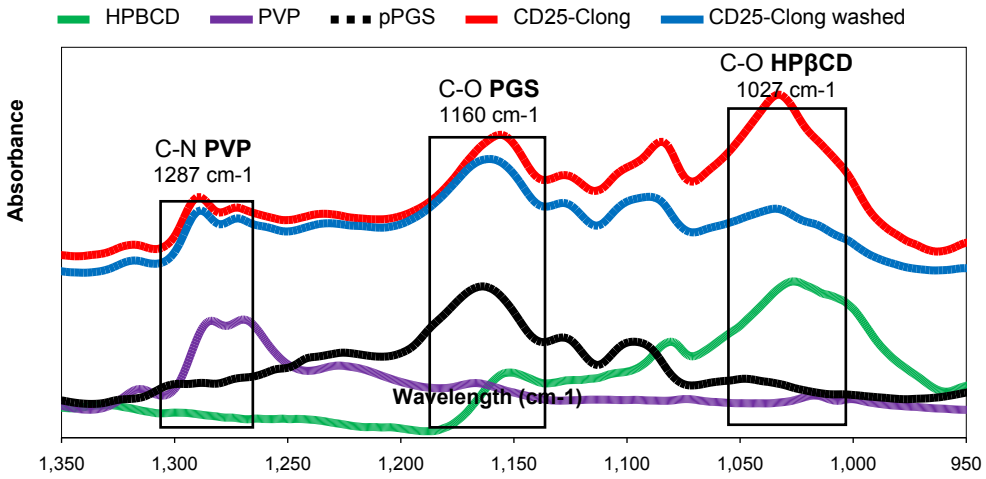

Figure S7. Illustration of the effect of washing: evolution of C-N (from PVP) and C-O (from HPβCD) bands before and after washing.

Infra-red supplementary curves:

For PVA50:

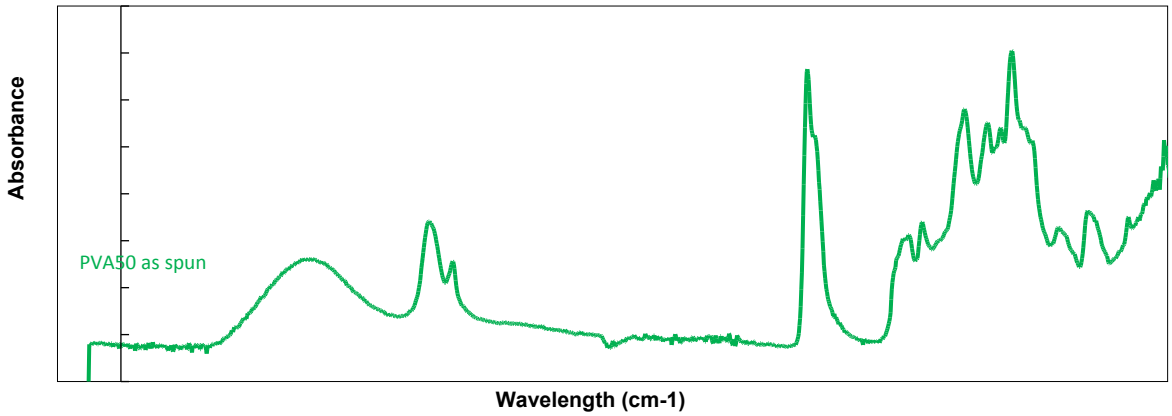

Figure S8. Infra-red spectra for PVA50 as spun.

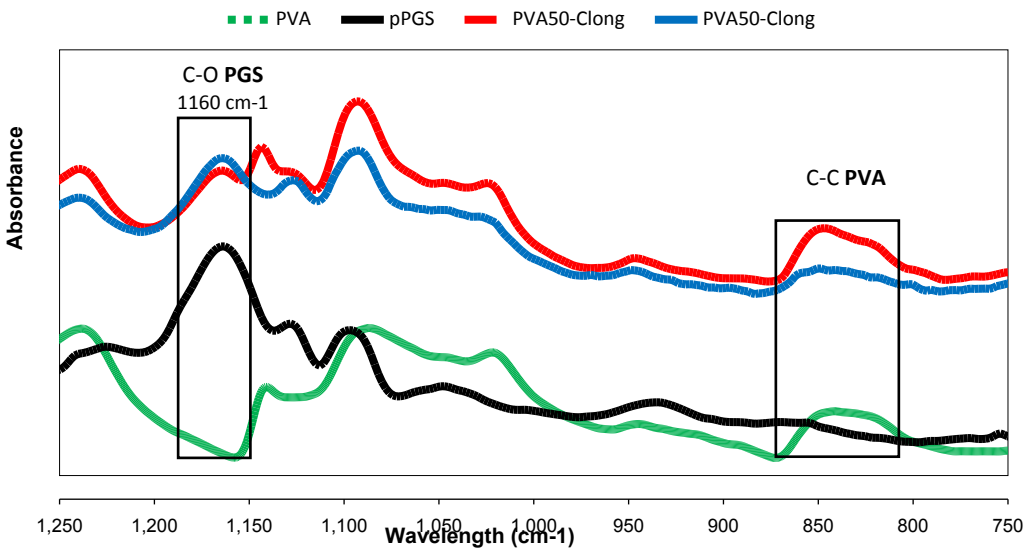

Figure S9. Illustration of the effect of washing: evolution of C-C (from PVA) and C-O (from PGS) bands before and after washing.

Stress-strain curves for tensile tests until break:

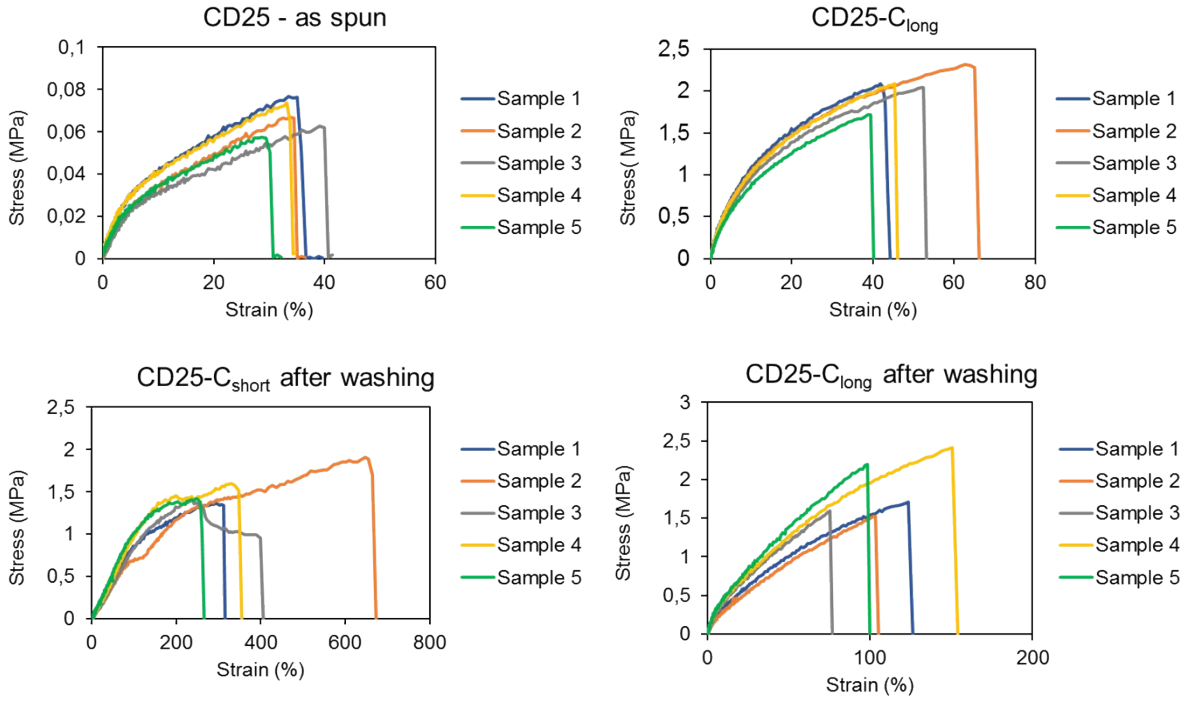

Figure S10. Stress-strain curves for **CD25** (50% PGS, 25% HPβCD and 25% PVP) before curing, after curing C_{long} (24h at 120°C, 48h at 140°C and 24h at 170°C) and after washing in water.

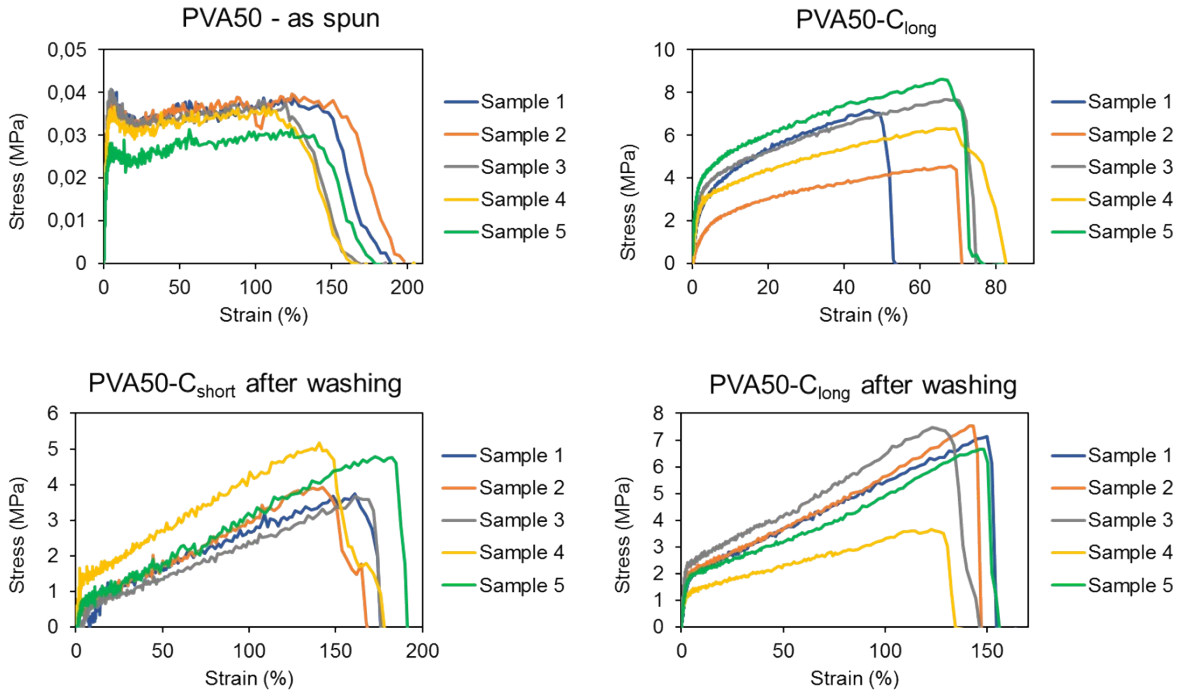

Figure S11. Stress-strain curves for PVA50 (50% PGS and 50% PVA) before curing, after curing C_{long} (24h at 120°C, 48h at 140°C and 24h at 170°C) and after washing in water.

Stress-strain curves for cyclic tensile tests:

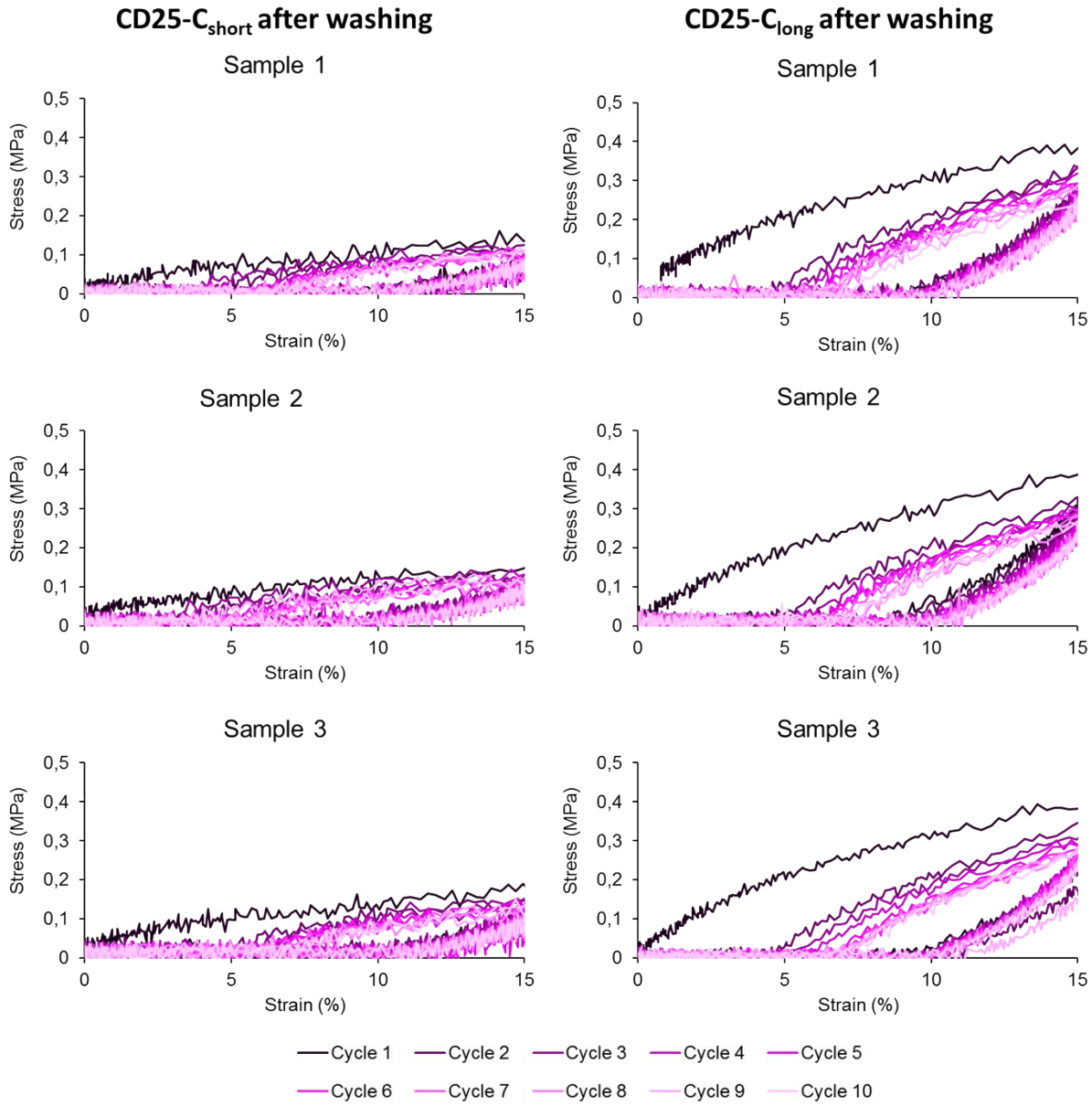

Figure S12. Stress-strain curves for cyclic tensile tests on CD25 (50% PGS, 25% HPβCD and 25% PVP) after curing C_{short} (24h at 120°C and 48h at 140°C) or C_{long} (24h at 120°C, 48h at 140°C and 24h at 170°C) and washing in water.

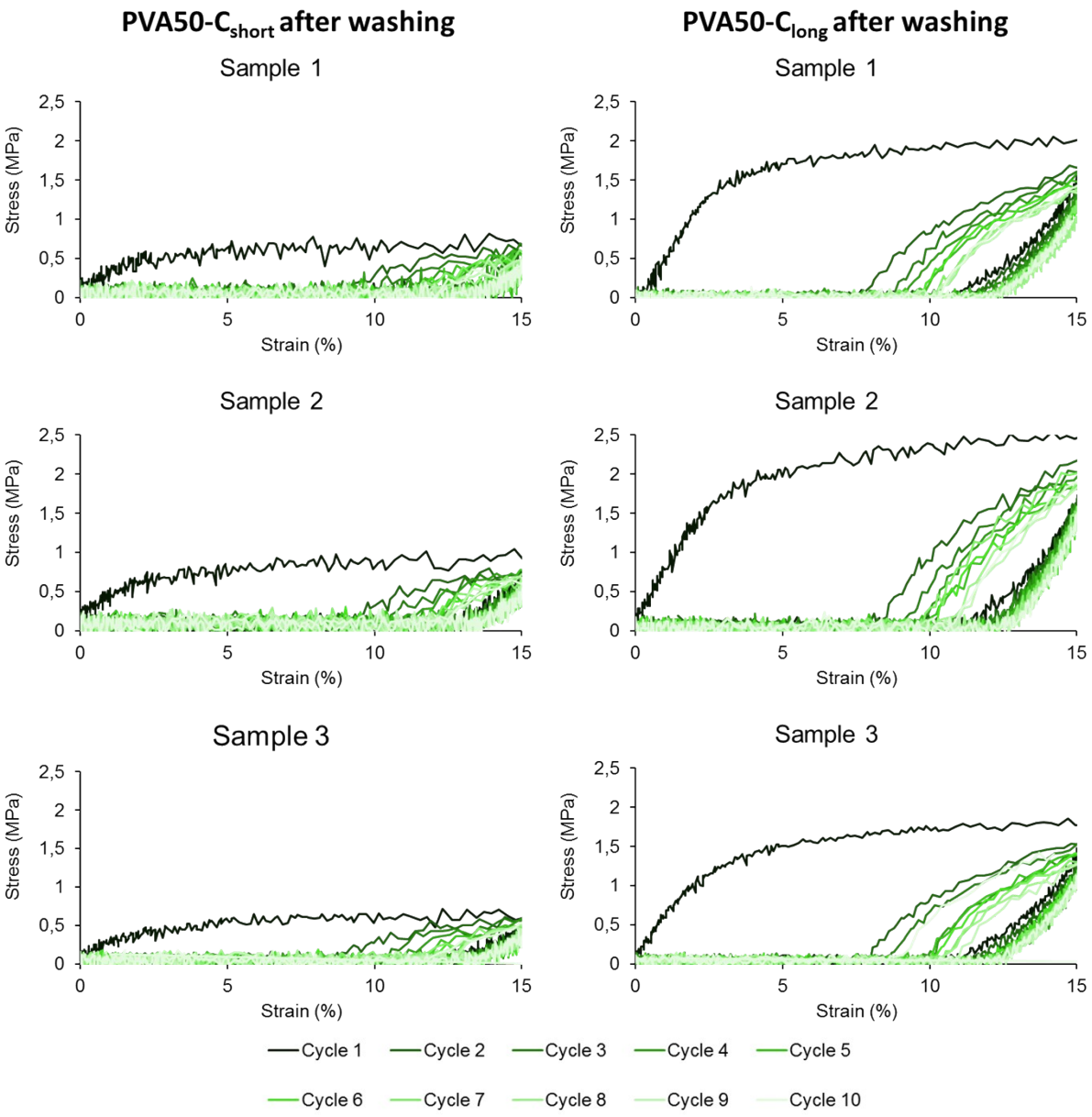

Figure S13. Stress-strain curves for cyclic tensile tests on PVA50 (50% PGS and 50% PVA) after curing C_{short} (24h at 120°C and 48h at 140°C) or C_{long} (24h at 120°C, 48h at 140°C and 24h at 170°C) and washing in water.