

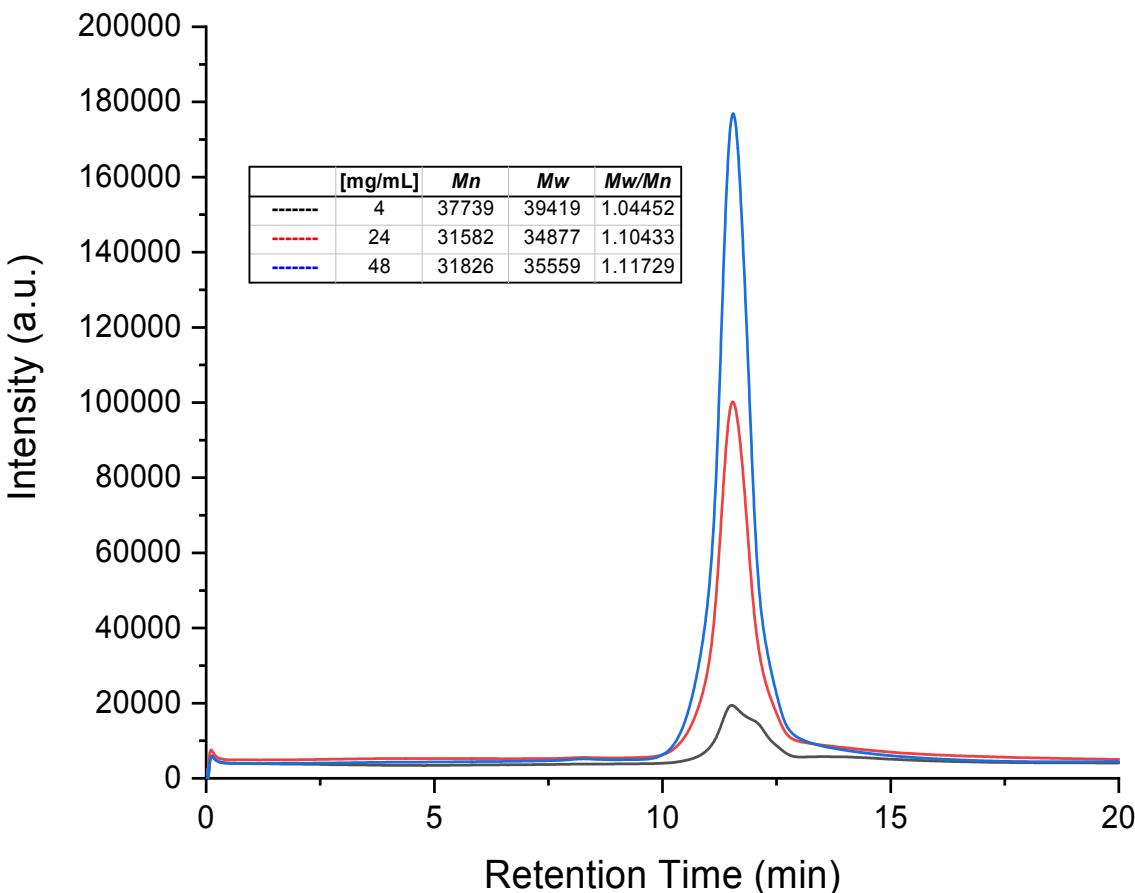
## SUPPORTING INFORMATION

### Self-assembly of supramolecular chemoenzymatic poly-L-Phenylalanine

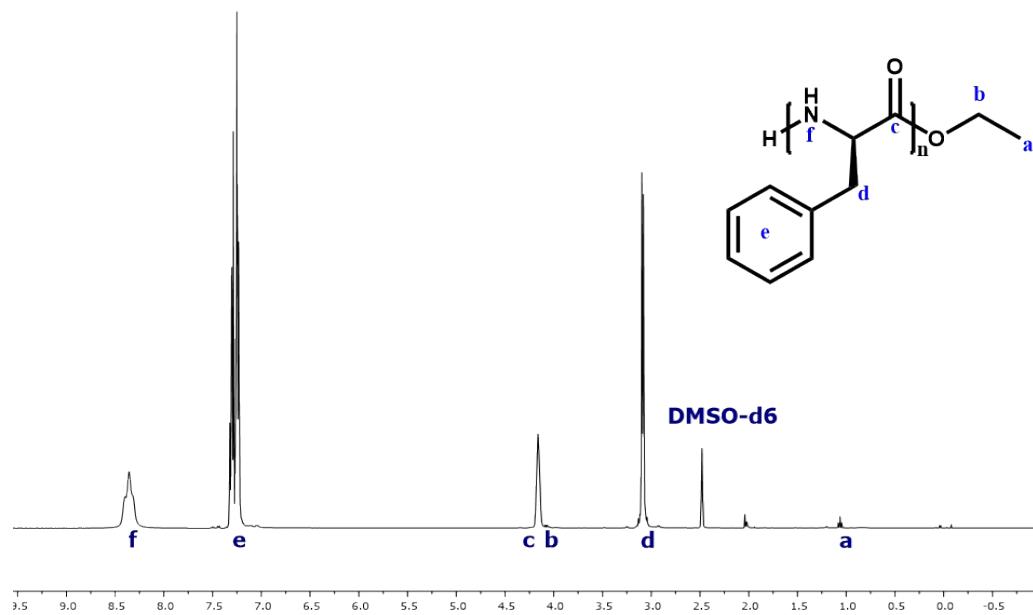
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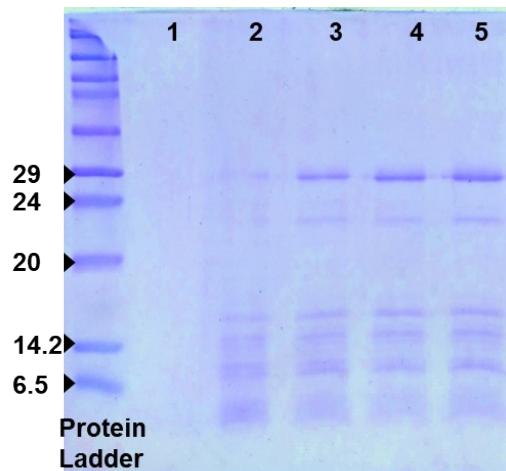
<sup>b</sup> Chemical Engineering Department, Escola d'Enginyeria de Barcelona Est-EEBE, c/Eduard Maristany 10-14, Barcelona, Spain



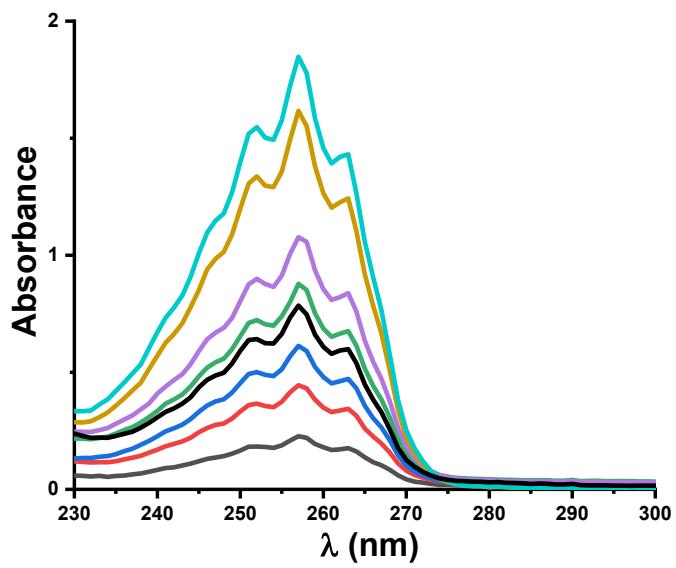
**Figure S1.** SEC traces runs from different sample concentrations against PMMA standards.



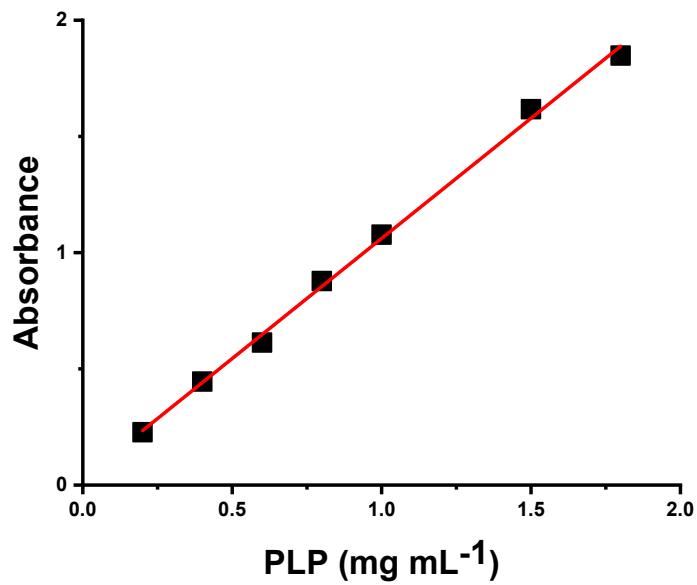
**Figure S2.** <sup>1</sup>H NMR spectra for PLP



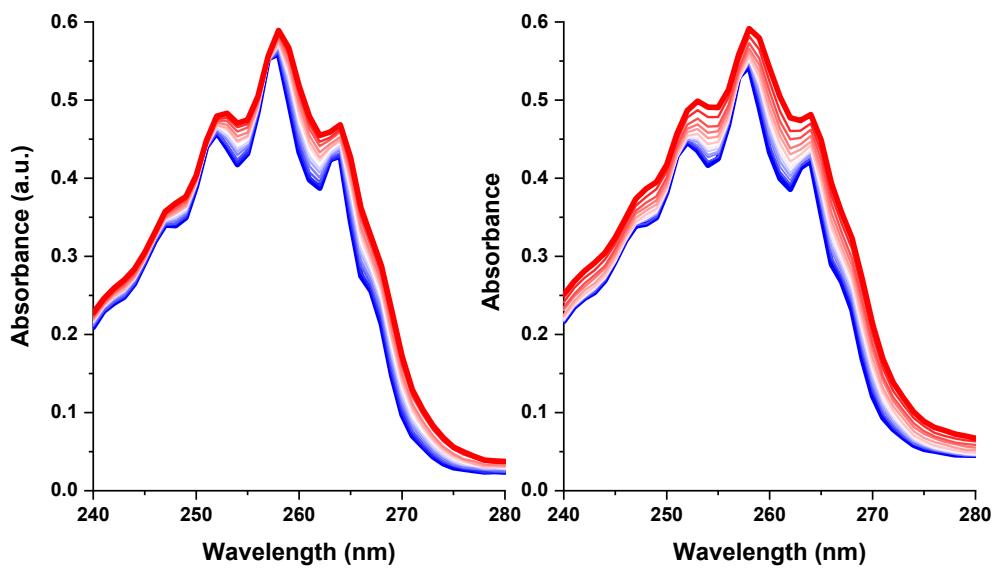
**Figure S3.** SDS-PAGE of PLP fresh solution from reactor (1), concentrated sample by nano-filtration (2-5).



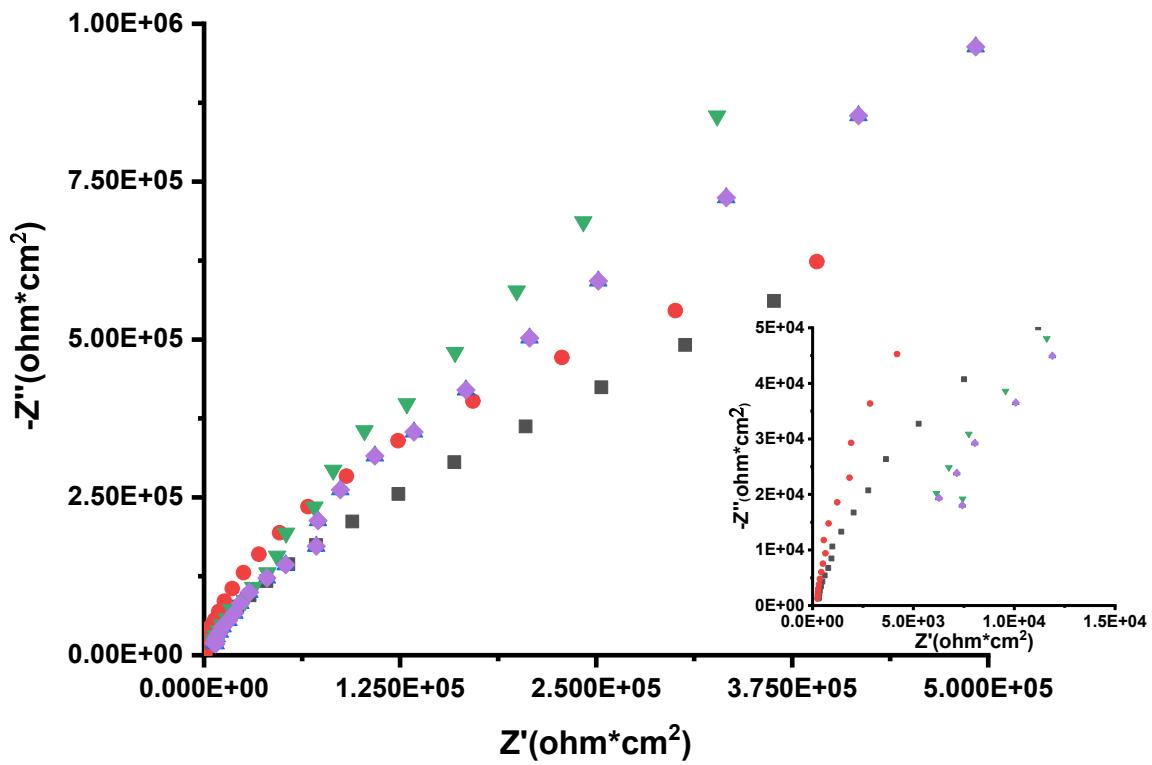
**Figure S3-1.** UV-vis absorption spectra ( $\epsilon_{257\text{ nm}} = 2.08 \times 10^4 \text{ L mol}^{-1}\text{cm}^{-1}$ ) with different ePLP concentrations (0.2-1.8 mg/mL).



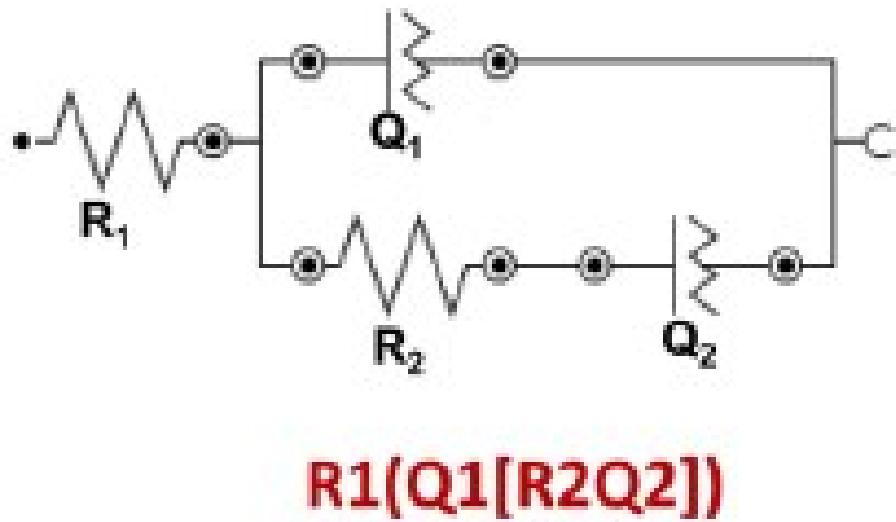
**Figure S3-2.** Calibration curve for PLP in water by UV-vis spectroscopy.



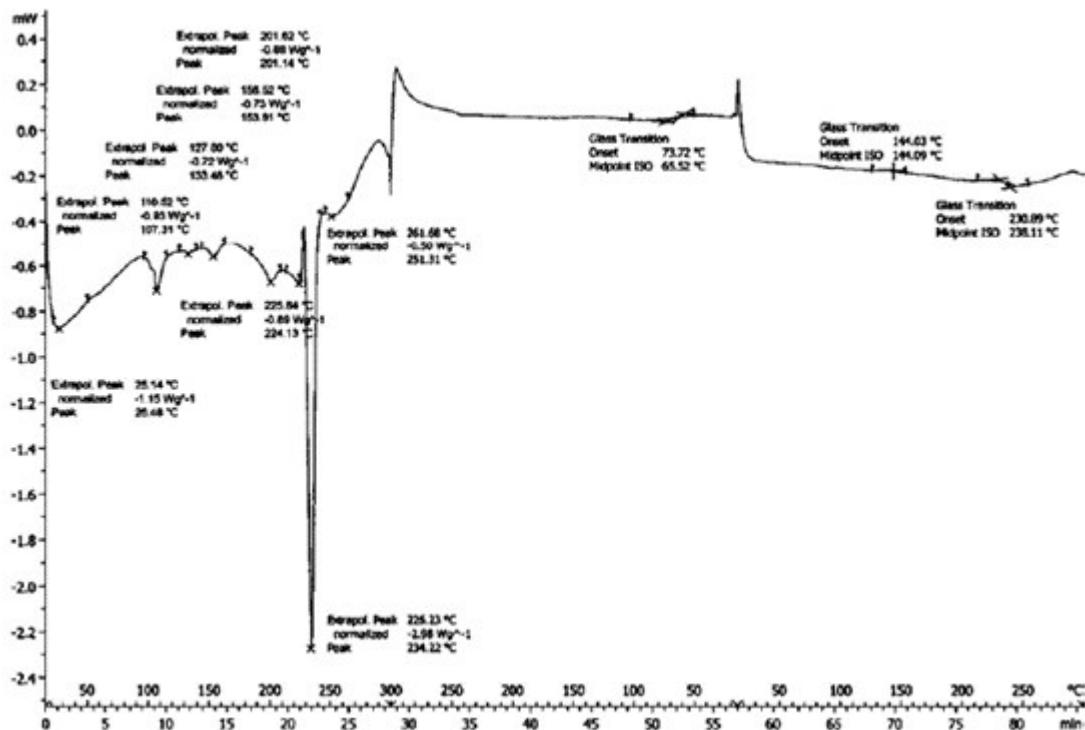
**Figure S4.** UV spectra upon heating from 25 °C (blue) to 90 °C (red) for water-solubilized (a), and urea-solubilized (b) ePLP.



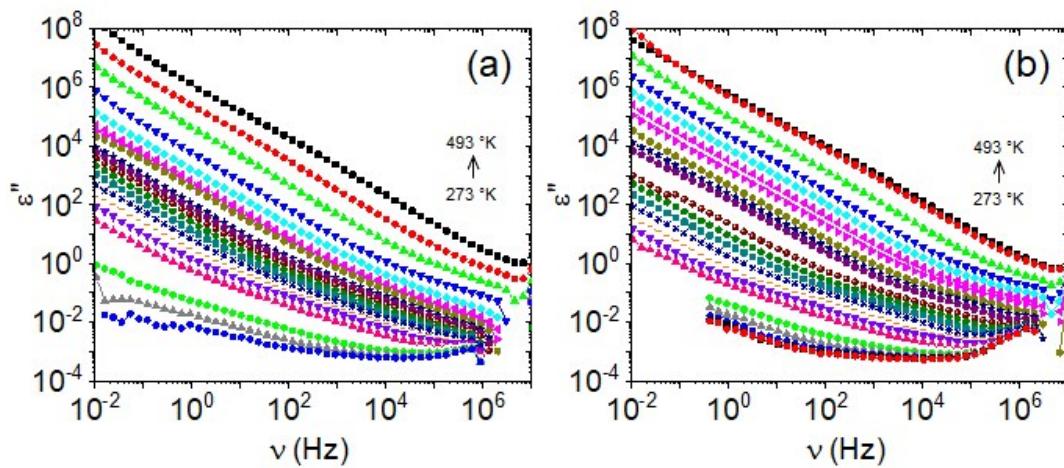
**Figure S5.** Nyquist plot of ePLP nanotubes (black and red symbols) and ePLP bulk (green and purple symbols). The inset represents a detail of the high- frequency region.



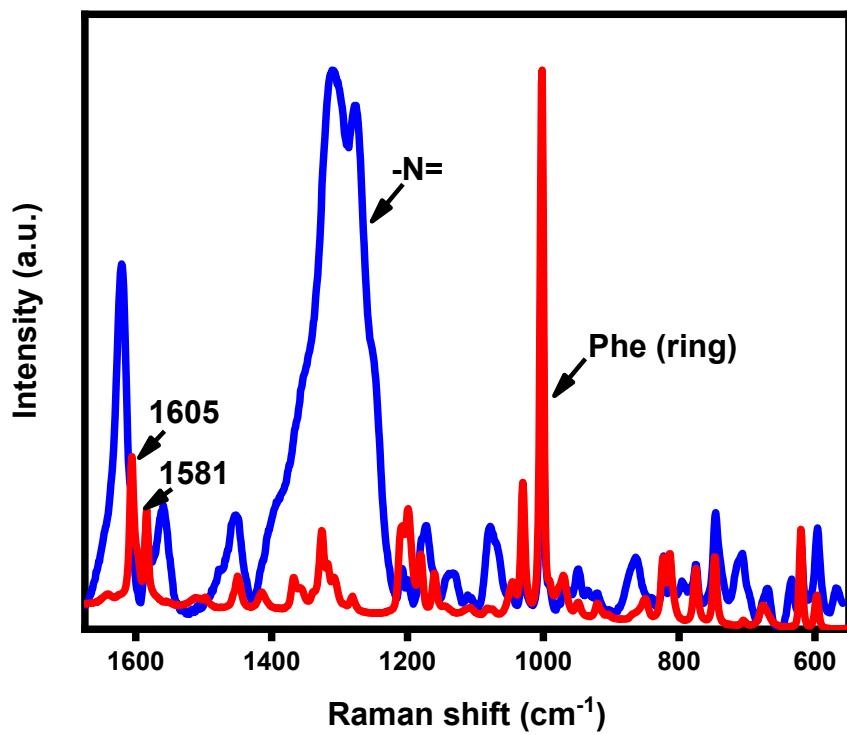
**Figure S6.** Equivalent electrical circuit



**Figure S7.** DSC for ePLP.



**Figure S8.** Imaginary part ( $\epsilon'' \omega$ ) of the dielectric constant for disordered (a) and nanotubes ePLP (b).



**Figure S9.** Raman spectra for PLP nanotubes (red); and TC-loaded PLP nanotubes (blue).