

Supplementary Information

Hybrid Phytoglycogen-Dopamine Nanoparticles as Biodegradable Underwater Adhesives

Jiayi Liu, Dmitrii Sychev, Nadiia Davydiuk, Mahmoud Al Hussein, Andreas Fery and Quinn A. Besford*

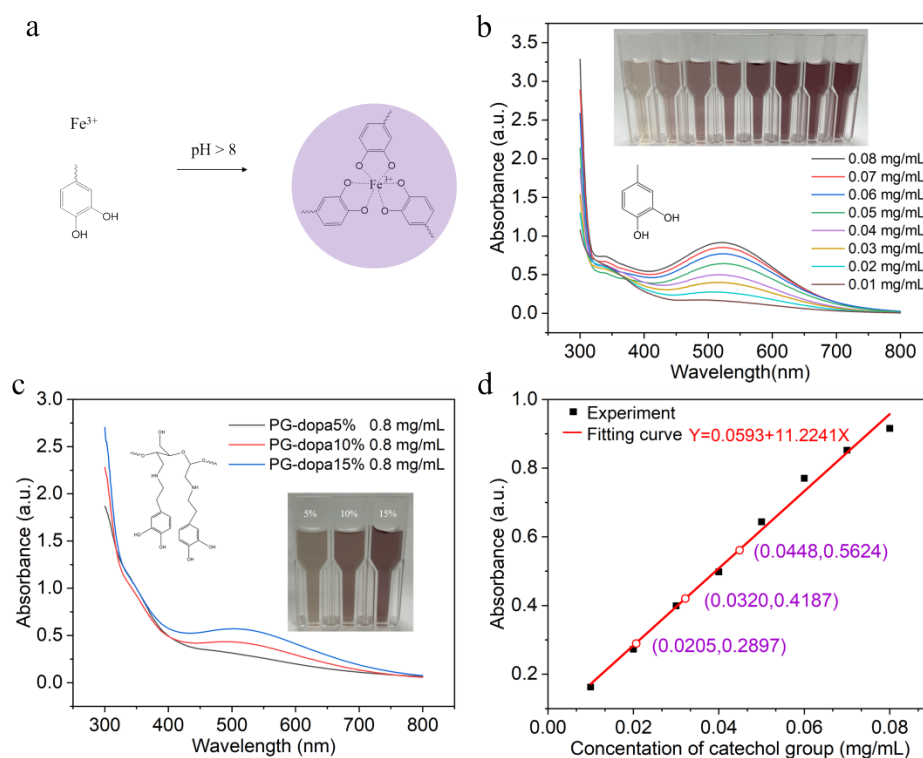


Figure S1. a) The solution of Fe^{3+} and catechol group turns to purple at $\text{pH} > 8$. b) UV-vis spectra of 4-methylcatechol with different concentration, the concentration of ferric chloride is 0.05 mg/mL, pH 8 in carbonate buffer. c) UV-vis spectra of different PG-dopa, the concentration of PG-dopa is 0.08 mg/mL, the concentration of ferric chloride is 0.05 mg/mL, pH 8 in carbonate buffer. d) The UV-vis absorbance intensity of 4-methylcatechol (black square dot) and PG-dopa (hollow red circle) at wavelength 525 nm as a function of the catechol group concentration.

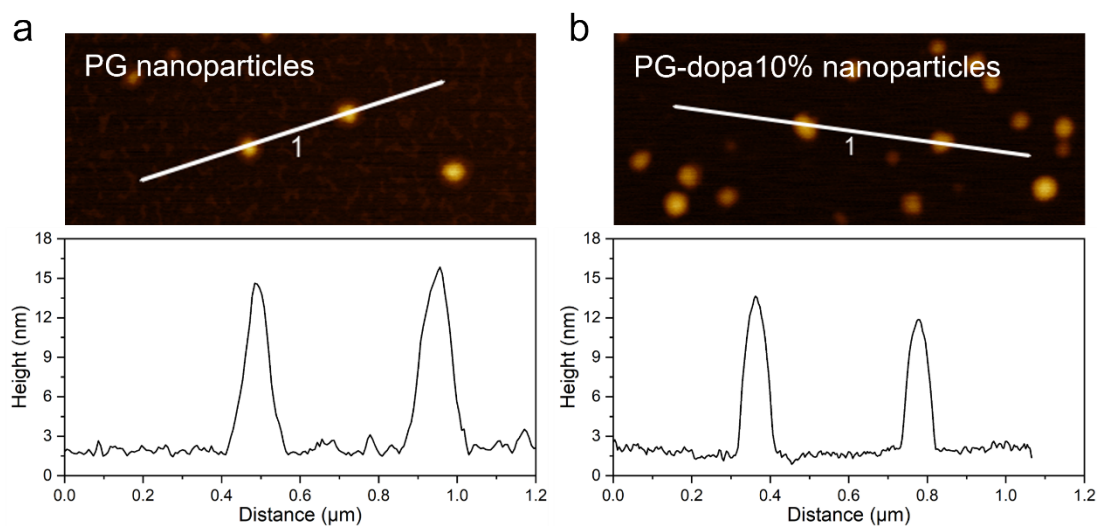


Figure S2. The height of PG and PG-dopa10% nanoparticles by AFM topography images.

Table S1. The Z-Average, distribution and zeta potential of PG and PG-dopa10% nanoparticle water dispersion from DLS measurement

	Z-average (nm)	Distribution (PDI)	Zeta potential (mV)
PG	71.52	0.084	-2.04
PG-dopa10%	111.4	0.239	-15.0

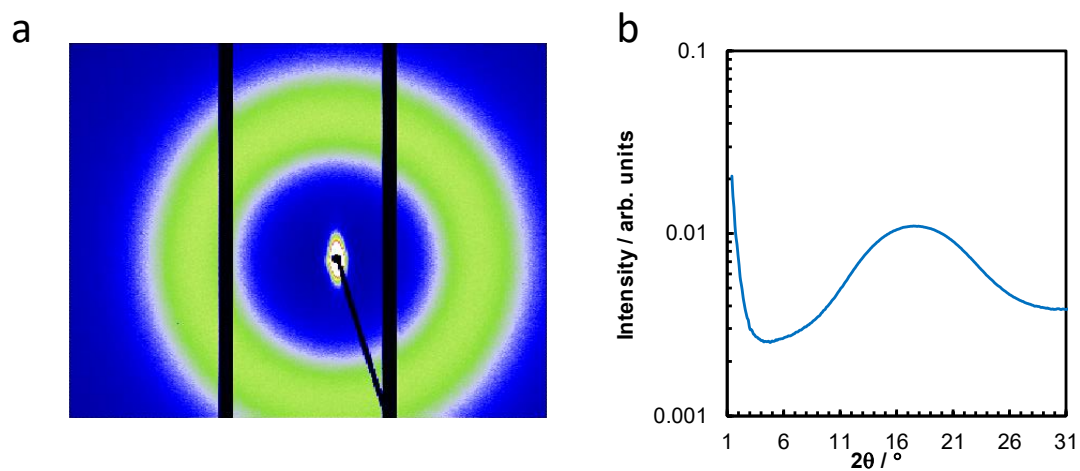


Figure S3. a) 2D WAXS pattern of PG-dopa10% sheet. b) Corresponding radially integrated profile of the 2D WAXS pattern indicating the amorphous nature of the PG-dopa10%.

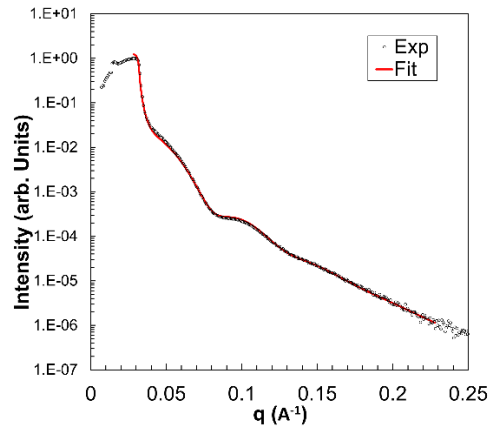


Figure S4. XRR of PG-dopa10% coating on silicon wafer.

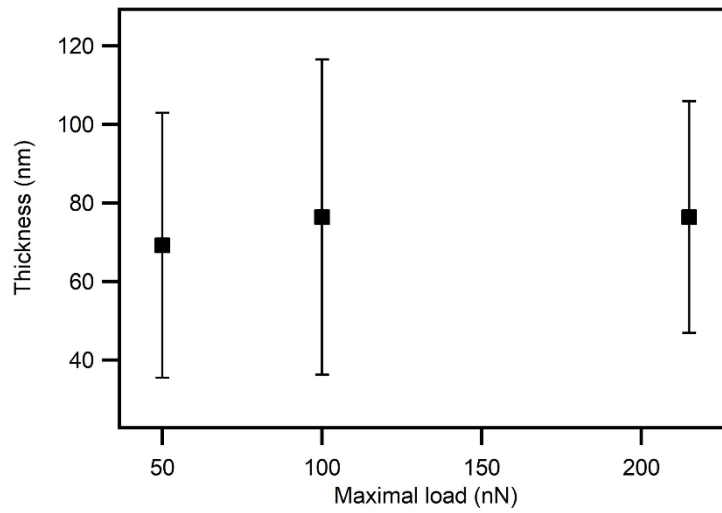


Figure S5. The maximum deformation (thickness) of PG-dopa10% coating by colloidal probe AFM at different load forces.

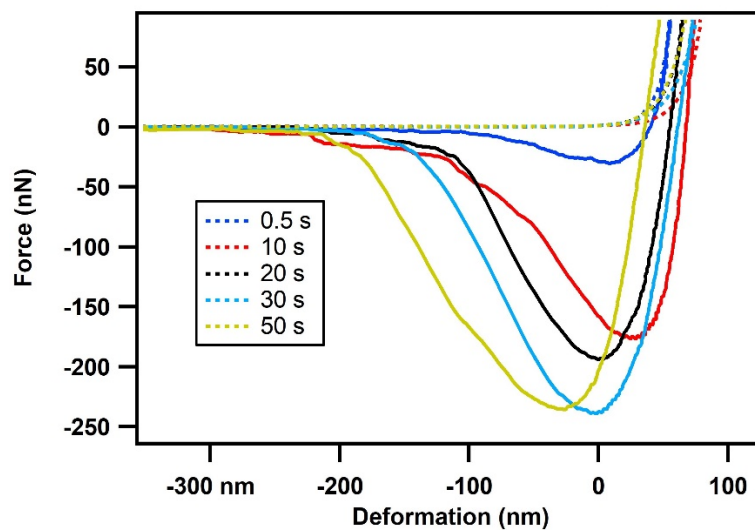


Figure S6. Representative force-deformation curves recorded on PG-dopa10% coating. The dashed line represents the approach part and the solid line represents the retraction part of the force-deformation curves.

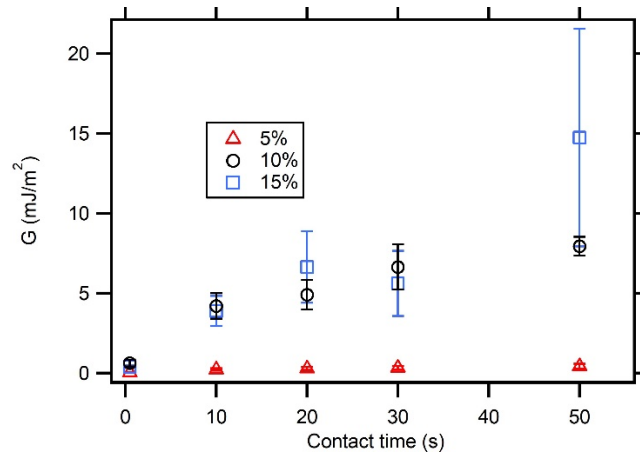


Figure S7. The strain energy release rate G of PG-dopa5%, PG-dopa10%, PG-dopa15% coating as a function of contact time.

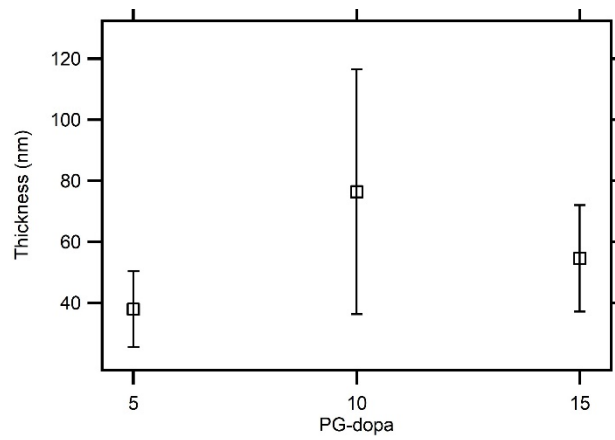


Figure S8. The maximum deformation (thickness) of PG-dopa5%, PG-dopa10%, PG-dopa15% coating by colloidal probe AFM.

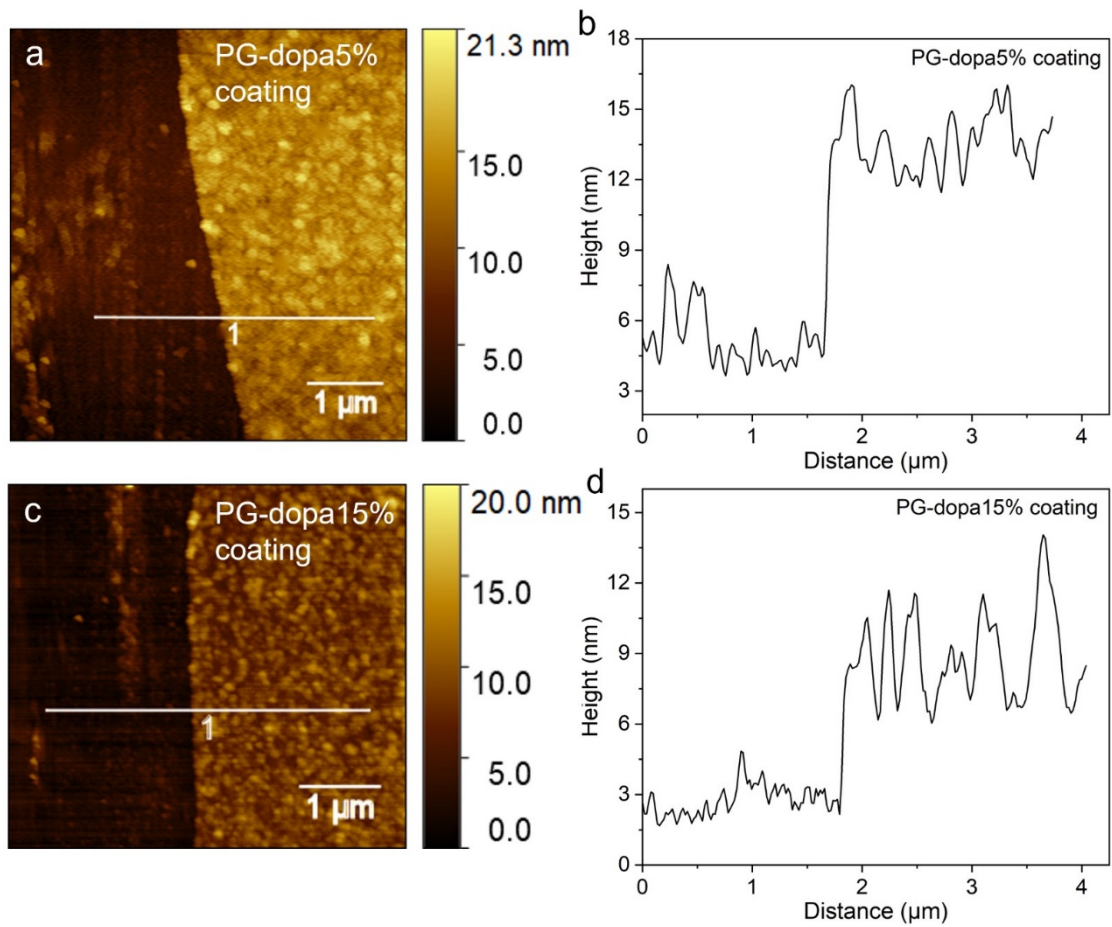


Figure S9. AFM topography image of a scratch of (a) PG-dopa5% and (c) PG-dopa15% coatings on silicon wafers, with corresponding line profiles (b) and (d), respectively.

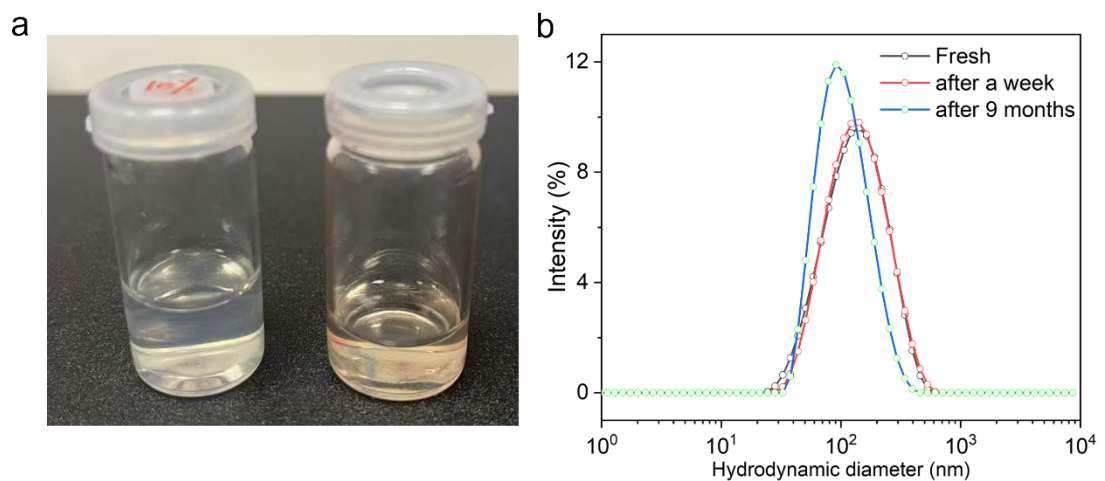


Figure S10. a) A fresh PG-dopa10% water dispersion (left) and the PG-dopa10% water dispersion after storing in the 4 °C fridge 9 month (right). b) DLS hydrodynamic diameter populations of a fresh PG-dopa10% sample and samples after storing in the 4 °C fridge a week and 9 months.