Supporting information

A nanolayer coating on polydimethylsiloxane surfaces enables mechanistic study of bacterial adhesion influenced by material surface physicochemistry

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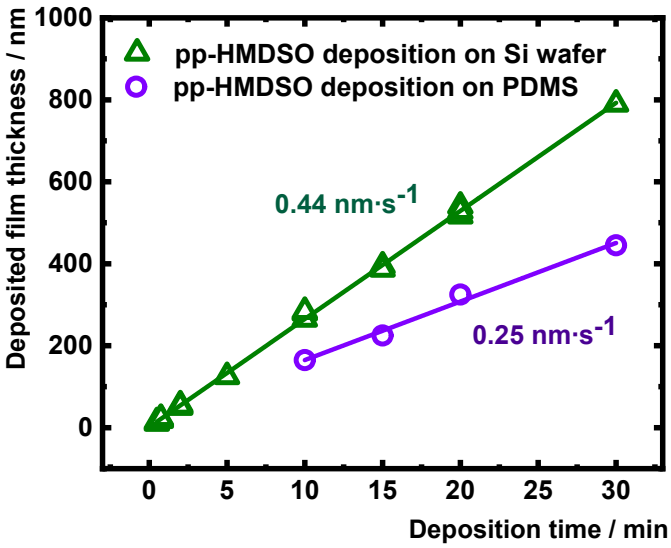

Figure S1. Calibration curve to adjust the thickness of HMDSO-derived plasma polymer films on PDMS species. The deposition rate was reduced compared to Si wafers due to the dielectric properties of PDMS.

Table S1. X-ray photoelectron spectroscopy (XPS) was utilized to survey the surface elemental compositions with and without PDMS-like nanolayer on different PDMS.

	Uncoated sample			Coated sample		
	C [%]	O [%]	Si [%]	C [%]	O [%]	Si [%]
PDMS 5:1	46.5	31.4	22.1	46.3	31.2	22.6
PDMS 10:1	46.6	31.1	22.3	45.2	33.6	21.2
PDMS 20:1	46.4	31.1	22.5	45.8	31.3	22.9
PDMS 30:1	45.9	31.5	22.6	46.1	31.1	22.9
PDMS 40:1	46.5	30.9	22.7	46.1	31.6	22.3

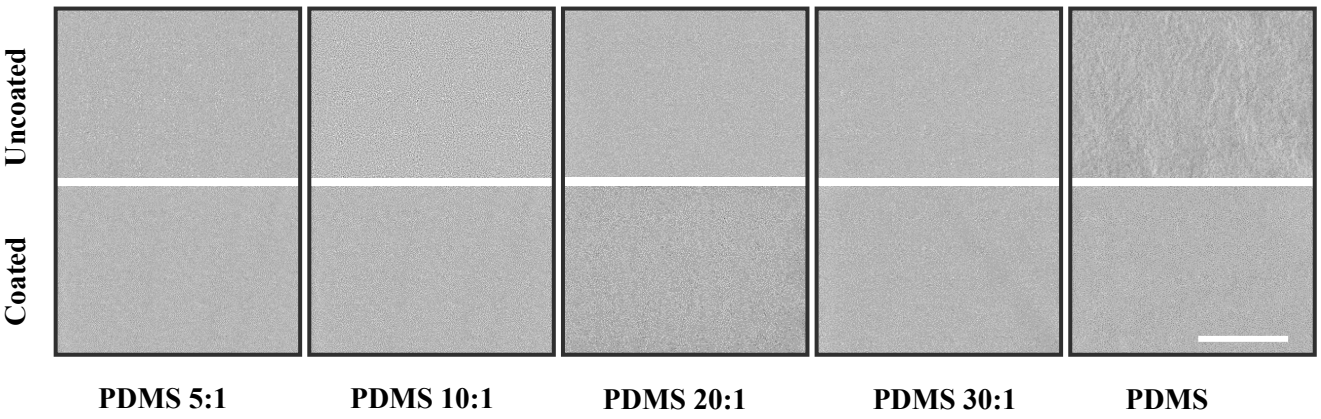

Figure S2. SEM analysis of the uncoated and coated PDMS samples. All samples were cleaned with 70% ethanol for 5 min, dried under nitrogen flow and then sputtered with 10 nm gold/platinum by an EM ACE600 sputter (Leica, Germany). SEM imaging was performed with an S-4800 scanning electron microscope (Hitachi, Japan). Scare bar: 3 μm.

Bulk material properties before and after coating

To ensure that the nanolayer coating on PDMS surfaces does not change the bulk material properties, the bulk mechanical properties of coated and uncoated PDMS samples were measured by rheometry. The shear complex modulus, a measure of the materials viscoelasticity, was similar for a given PDMS species before and after coating (Table 1). The shear complex modulus increased from 4.32 to 67.67 kPa for uncoated and from 3.93 to 65.21 kPa for coated samples with increasing crosslinker content (Table 1). The storage modulus (G') representing the elastic properties increased from 4.21 to 67.59 kPa and the loss modulus (G'') describing the viscous properties increased from 0.99 to 3.25 kPa with increasing crosslinking degree of the uncoated PDMS samples (Figure S3). The similar behaviour was also noted for the coated PDMS samples, i.e. with increasing crosslinking degree the storage modulus increased from 3.83 to 65.14 kPa and the loss modulus increased from 0.90 to 3.02 kPa, respectively. The HMDSO nanolayer on PDMS was further analysed for its influence on the substrate deformability using *in situ* dynamic rheology at 37 °C. Storage modulus, indicating the stored energy during deformation, remained stable for a given PDMS species before and after coating, especially when angular frequency was less than 100 rad·s^{-1} (Figure S4, coloured in purple and blue). That is to say, the storage modulus behaved nearly independently with angular frequency. In contrast, the loss modulus representing energy loss (viscous property) during the deformation process showed an obvious increase with the increase of angular frequency

(Figure S4, coloured in grey and yellow), indicating angular frequency dependence of the loss modulus. Thus, the deposition of the HMDSO nanolayer has no impact on the bulk deformability of the PDMS material.

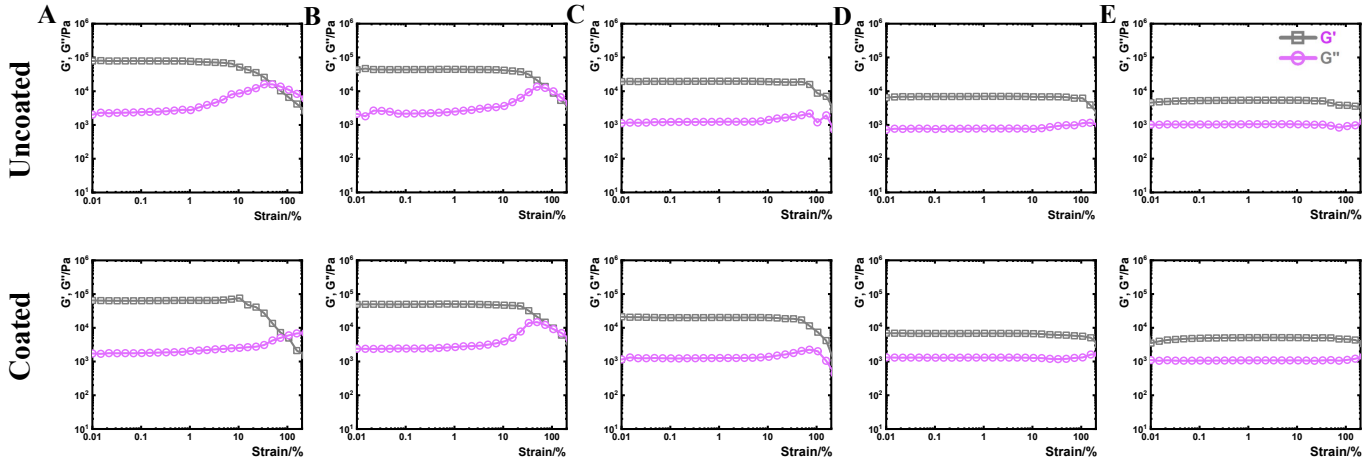

Figure S3. Rheological measurement by strain sweep. Upper panels: uncoated PDMS samples; Lower panels: coated PDMS samples. (A): PDMS 5:1 species; (B): PDMS 10:1 species; (C): PDMS 20:1 species; (D): PDMS 30:1 species; (E): PDMS 40:1 species. G' here is storage modulus representing the elastic properties and G'' is loss modulus describing the viscous properties. Three independent measurements were conducted and one set of measurement is displayed here.

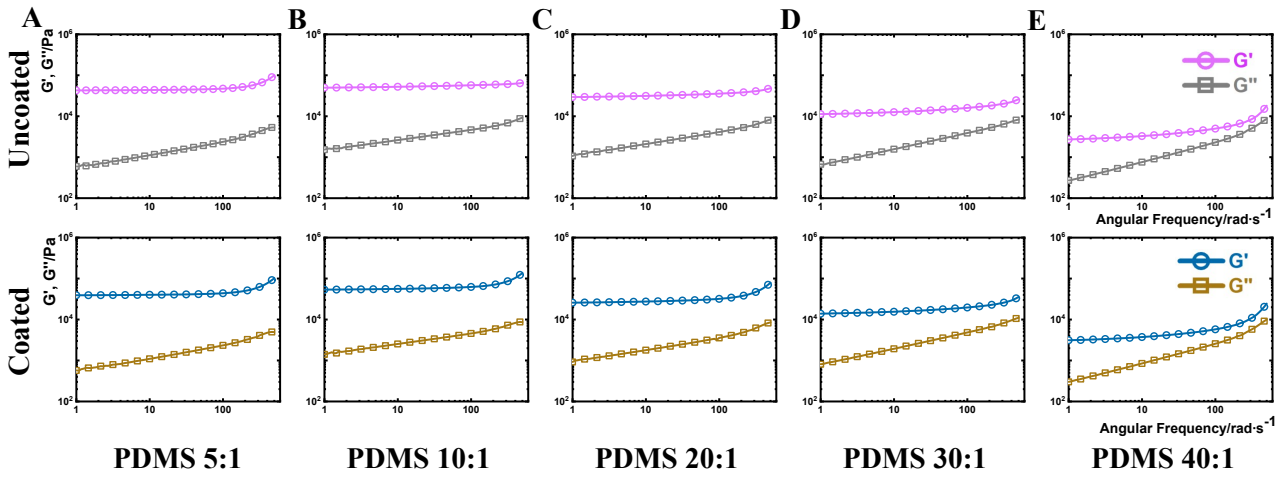

Figure S4. Substrate deformability analysed by rheological measurement of frequency sweep. Upper panels: uncoated PDMS samples; Lower panels: coated PDMS samples. (A): PDMS 5:1 species; (B): PDMS 10:1 species; (C): PDMS 20:1 species; (D): PDMS 30:1 species; (E): PDMS 40:1

species. Three independent measurements were conducted and one set of measurement is displayed here.