

## Supplementary Information

# **Towards conductive textiles: coating polymeric fibres with graphene**

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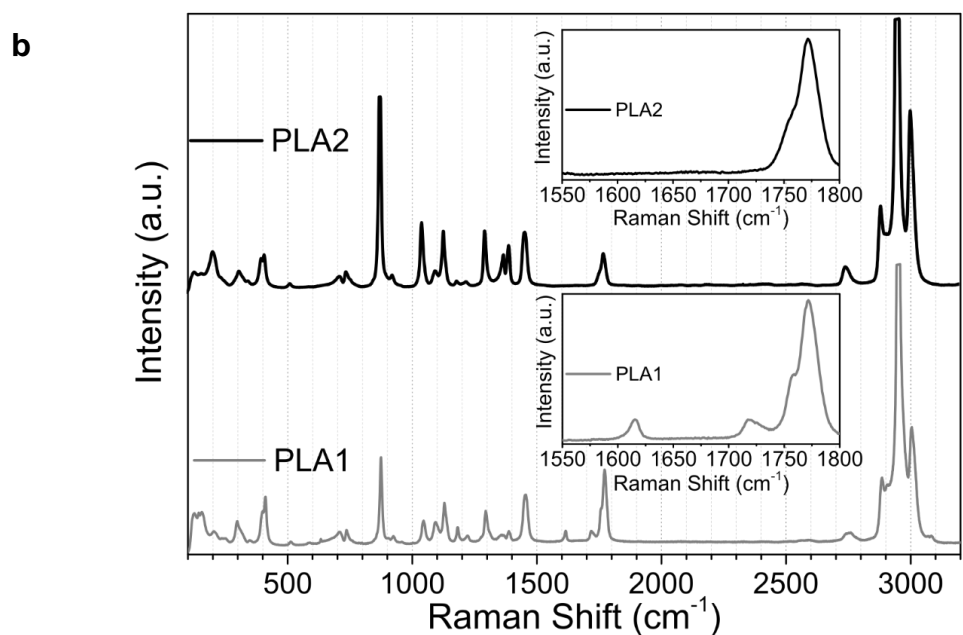
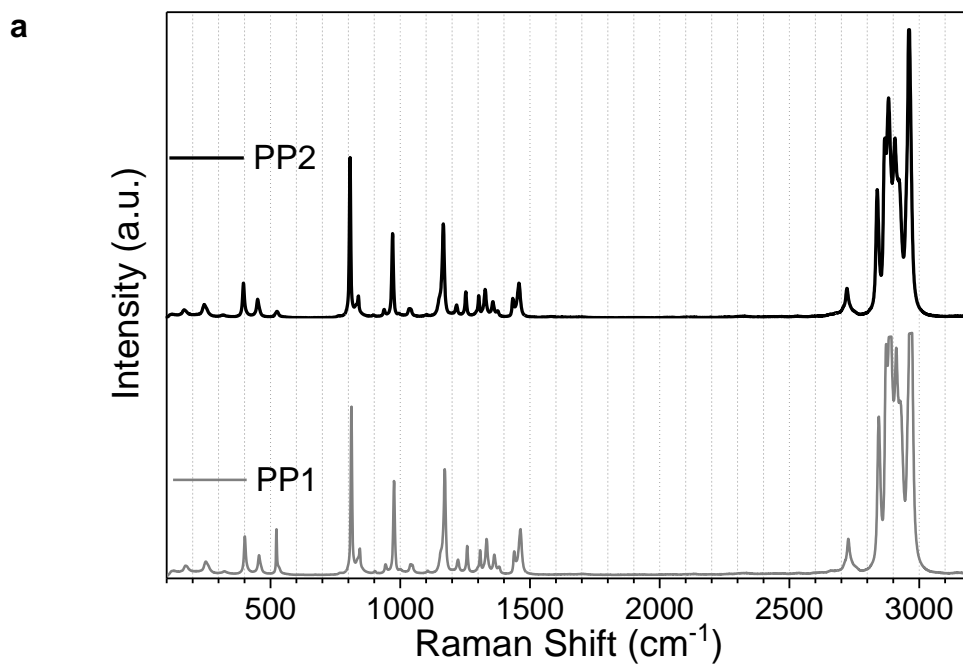
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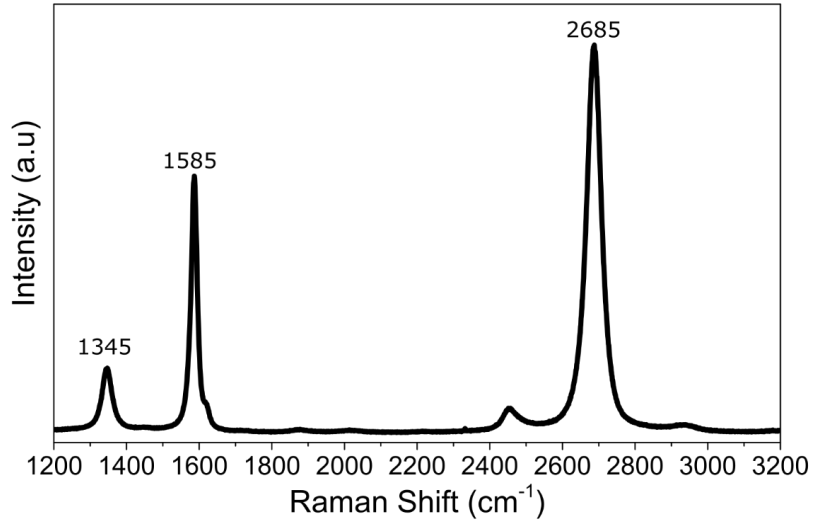
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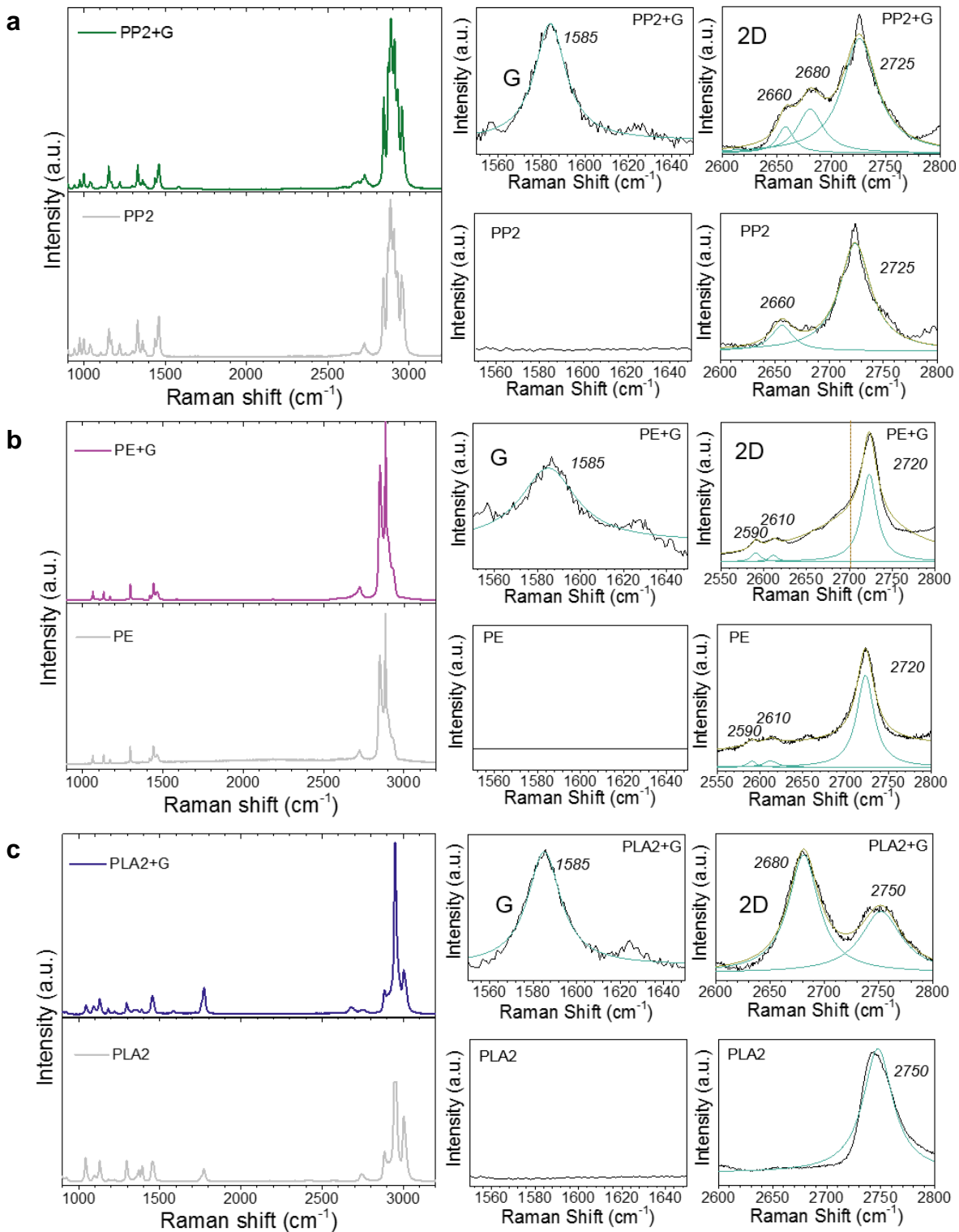
<sup>5</sup> CenTexBel, Technologiepark-Zwijnaarde 7, 9052 Ghent, Belgium



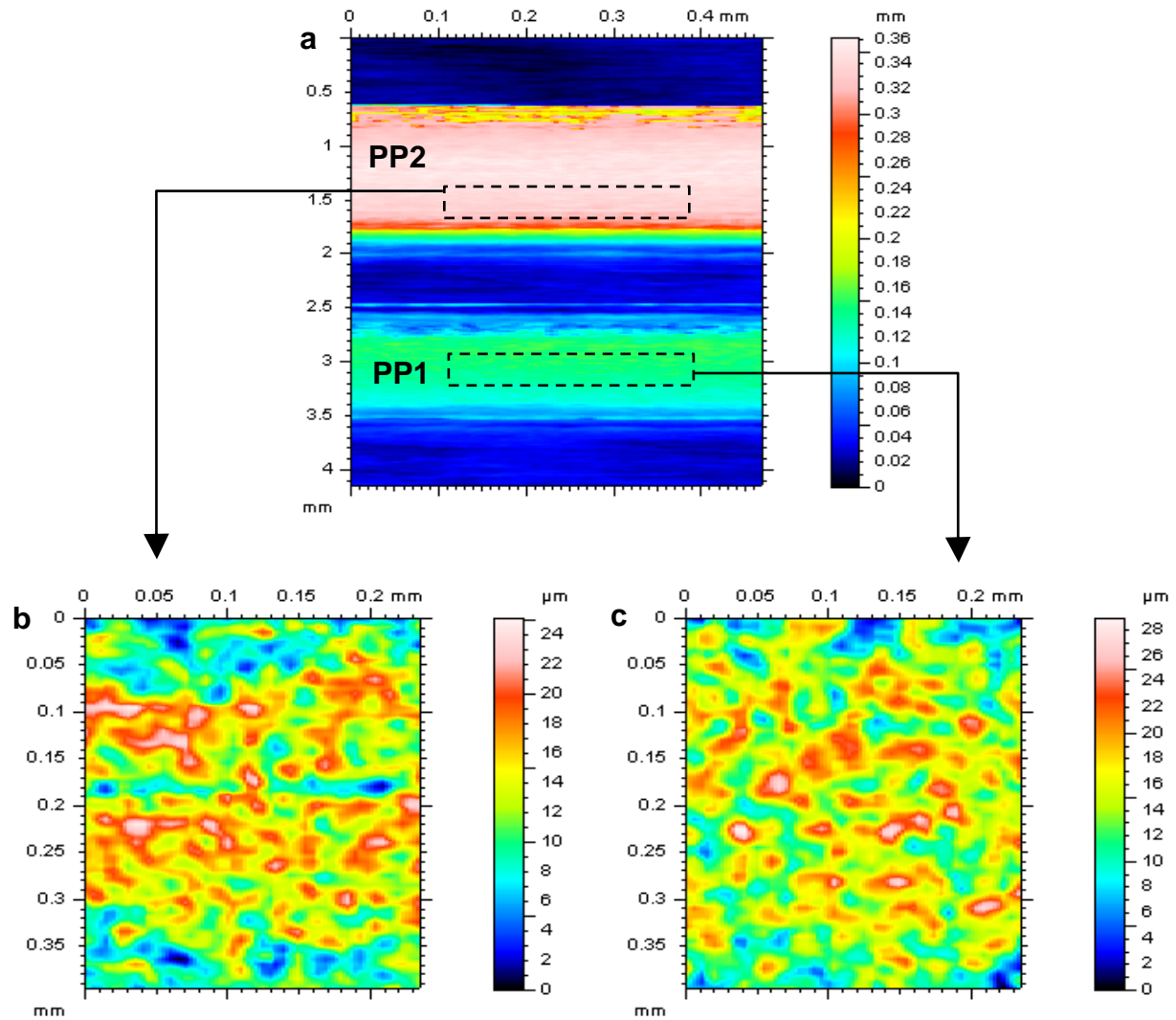
**Figure S1.** Full Raman spectra of **(a)** PP1 (grey, bottom) and PP2 (black, top); and **(b)** PLA1 (grey, bottom) and PLA2 (black, top). Insets show in detail the two additional peaks in PLA1 at  $1615 \text{ cm}^{-1}$  and  $1717 \text{ cm}^{-1}$ .



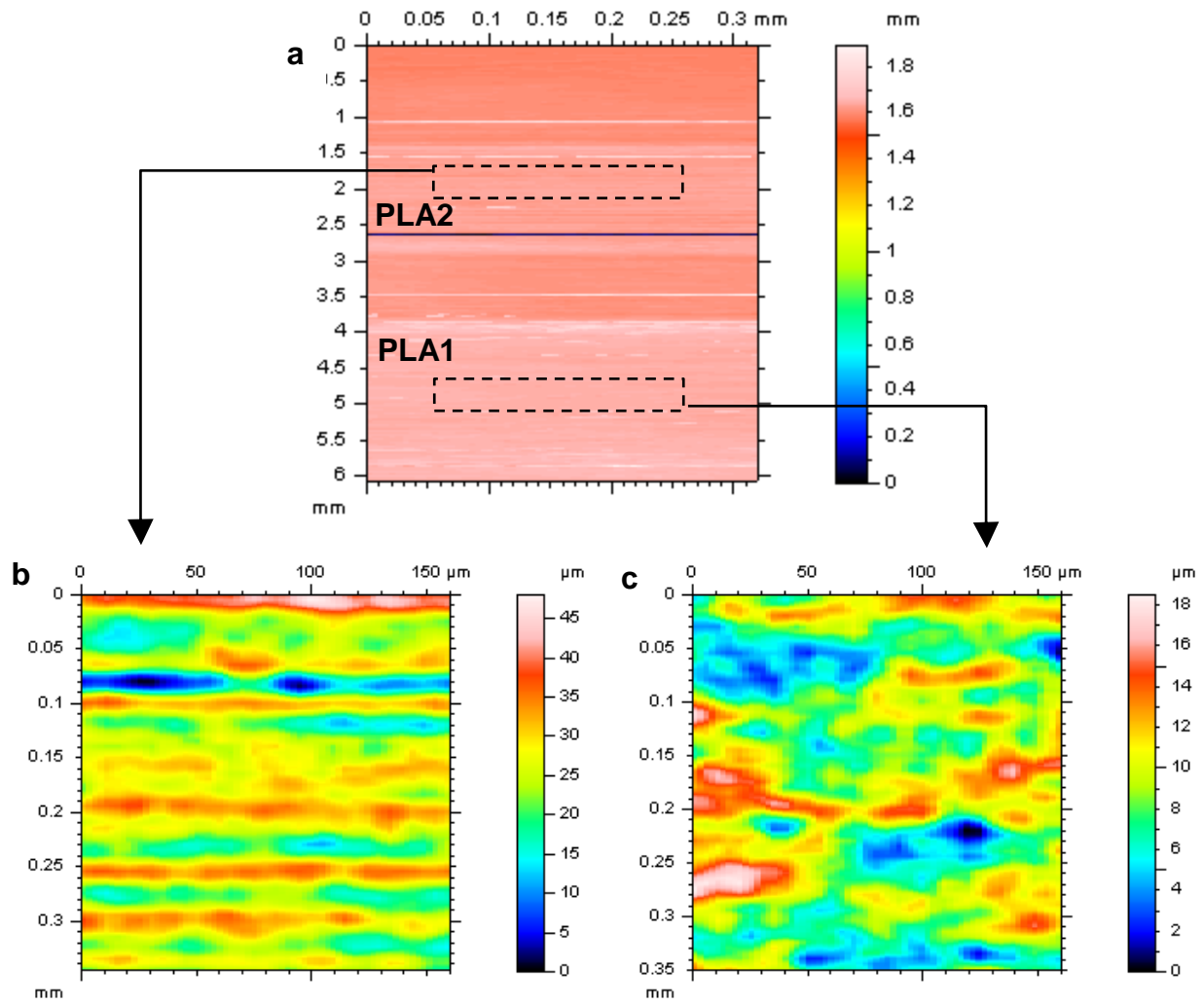
**Figure S2.** Raman spectra of the same type of graphene used to coat the fibres transferred to SiO<sub>2</sub>, with main peaks D, G and 2D, centred at 1345, 1585 and 2685 cm<sup>-1</sup>, respectively.



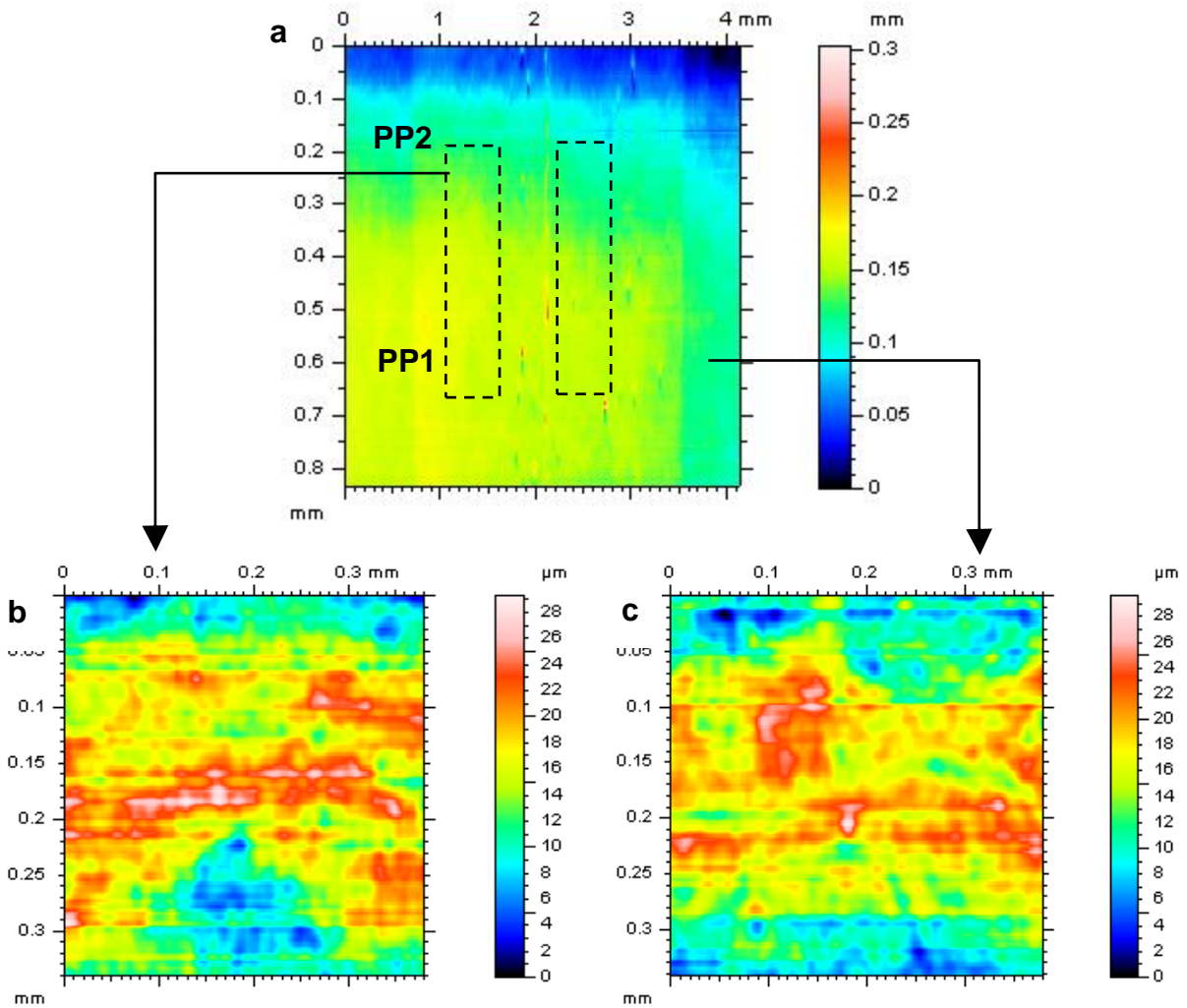
**Figure S3.** Extended Raman spectra for the fibres with and without graphene (left) and details of the G and 2D peak regions (right) with corresponding integrated peaks for: **(a)** PP2; **(b)** PE and **(c)** PLA2.



**Figure S4.** Height profiles determined using a non-contact scanning instrument: **(a)** PP2 and PP1 in the same scanning area, with rectangles illustrating where areas of 235 x 395 were taken for PP2 **(b)** and PP1 **(c)**.



**Figure S5.** Height profiles determined using a non-contact scanning instrument: **(a)** PLA 2 and PLA1 in the same scanning area, with rectangles illustrating where areas of 160 x 360 were taken for PLA2 **(b)** and PLA1 **(c)**.



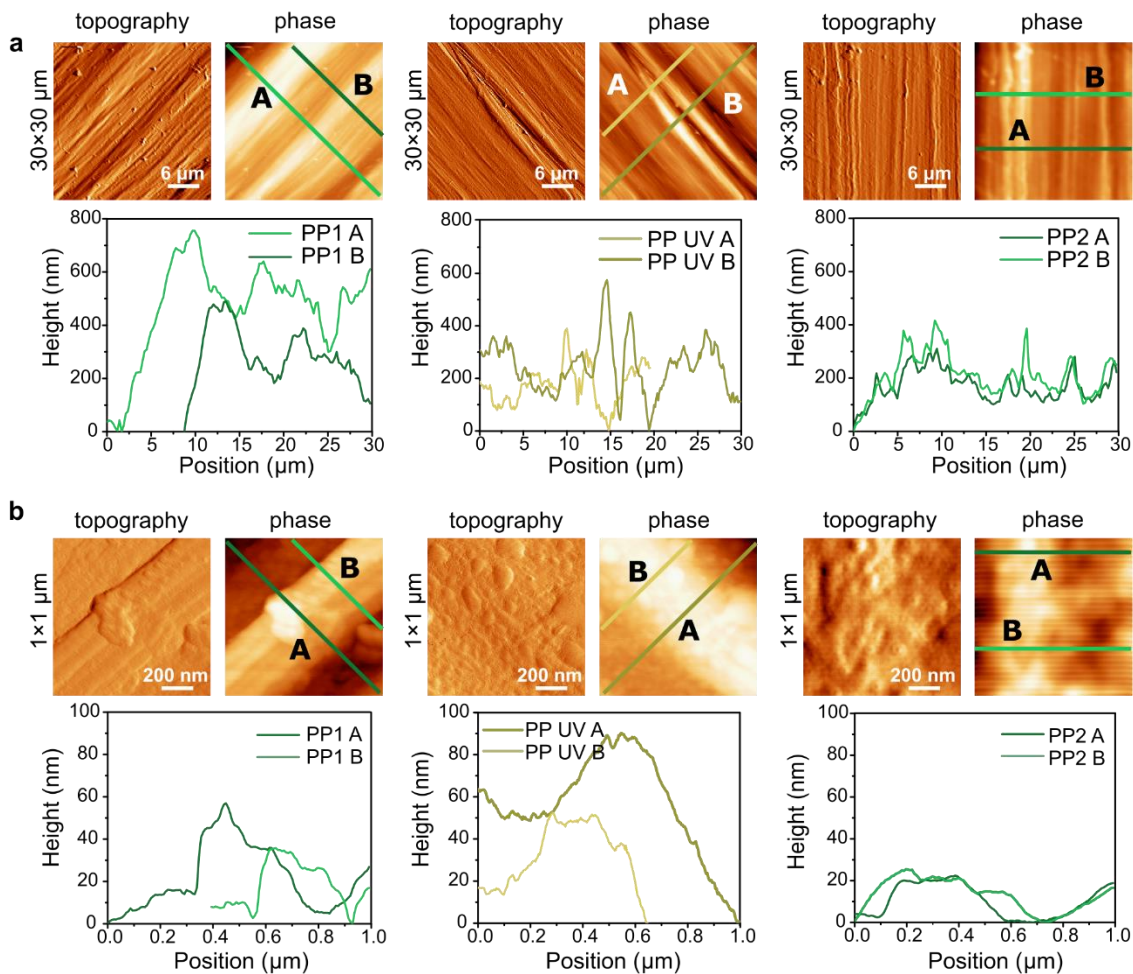
**Figure S6.** Height profiles determined using a non-contact scanning instrument for two sides of the same PE sample: **(a)** scanning area showing the whole sample, with rectangles illustrating where areas of 415 x 840 were taken for PEa, left hand side **(b)** and PEb, right hand side **(c)**.

**Table S1.** Surface Parameters for PLA1, PLA2, PP1, PP2 and two sizes of the same PE sample, PEa and PEb, calculated from Figures S1b, S1c, S2b, S2c, S3b and S3c, respectively. The width and length of the scanned area for the calculation of the parameters is also listed.

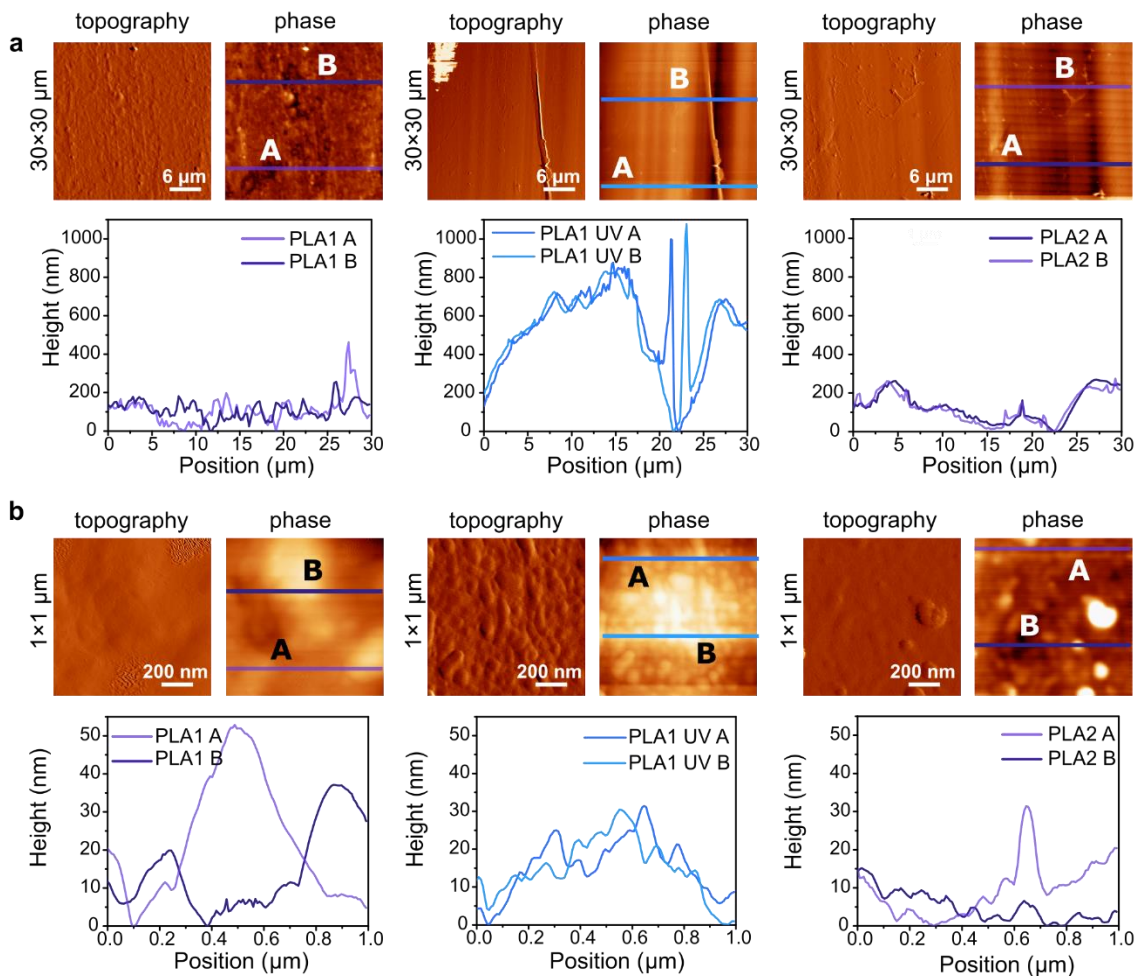
Parameter	PLA1	PLA2	PP1	PP2	PEa	PEb
Sa ( $\mu\text{m}$ )	2.4	5	3.27	3.4	3.95	4
Sq ( $\mu\text{m}$ )	2.96	6.46	4.09	4.16	4.82	4.77
Sp ( $\mu\text{m}$ )	9.55	22.3	14.1	12.1	13.6	14.5
Sv ( $\mu\text{m}$ )	8.96	25.7	14.8	13.1	15.7	15.1
St ( $\mu\text{m}$ )	18.5	48	28.9	25.1	29.3	29.6
Ssk	0.201	-0.303	0.00236	-0.00773	-0.186	-0.139
Sku	2.83	3.83	3.01	2.53	2.46	2.3
Sz ( $\mu\text{m}$ )	18.3	48	23.2	25.1	24.3	24.2
Width ( $\mu\text{m}$ )	160	160	235	235	415	415
Length ( $\mu\text{m}$ )	350	350	395	395	840	840

Sa: Average Roughness  
 Sq: Root Mean Square Roughness  
 Sp: Maximum Peak Height  
 Sv: Maximum Valley Depth  
 St: Total Height  
 Ssk: Skewness  
 Sku: Kurtosis  
 Sz: Maximum Height of Surface

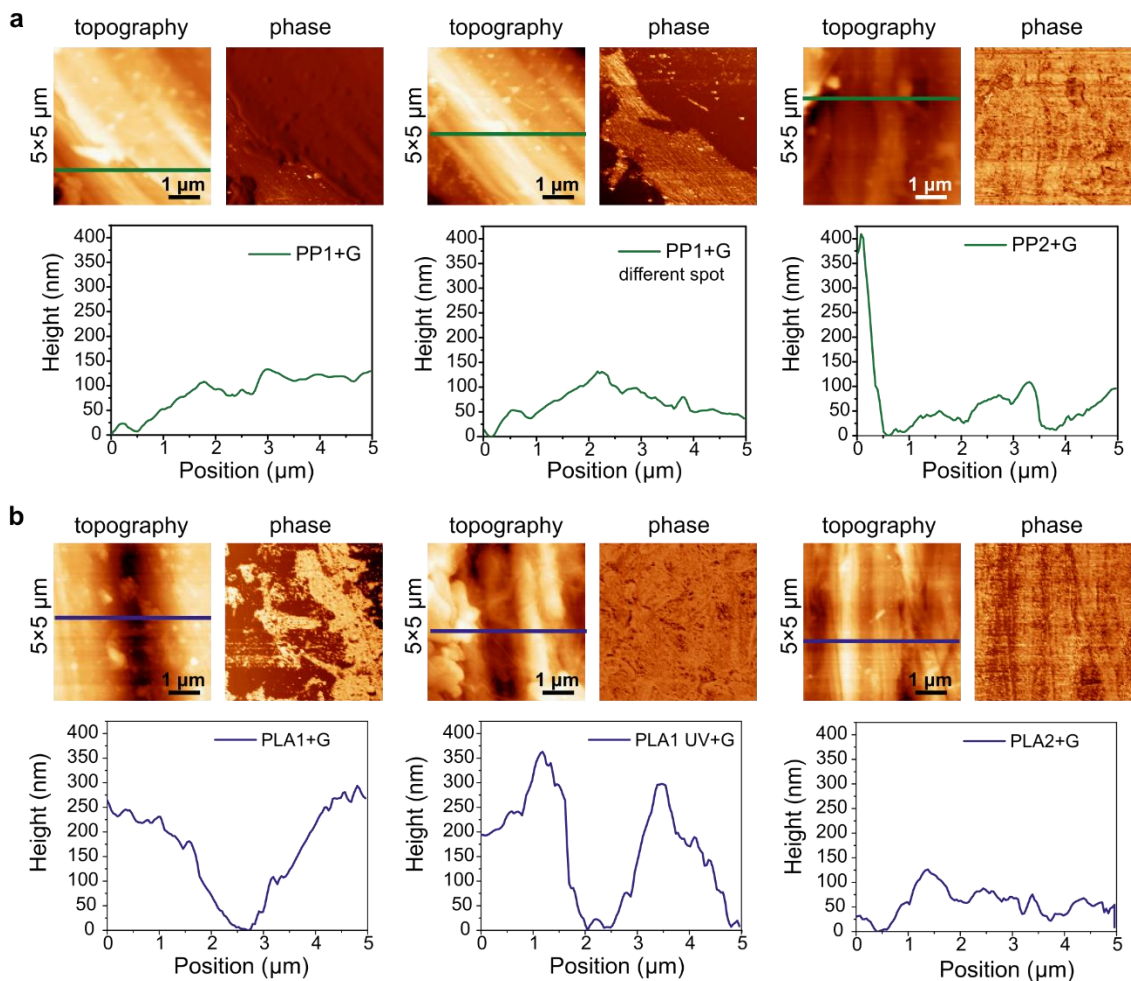




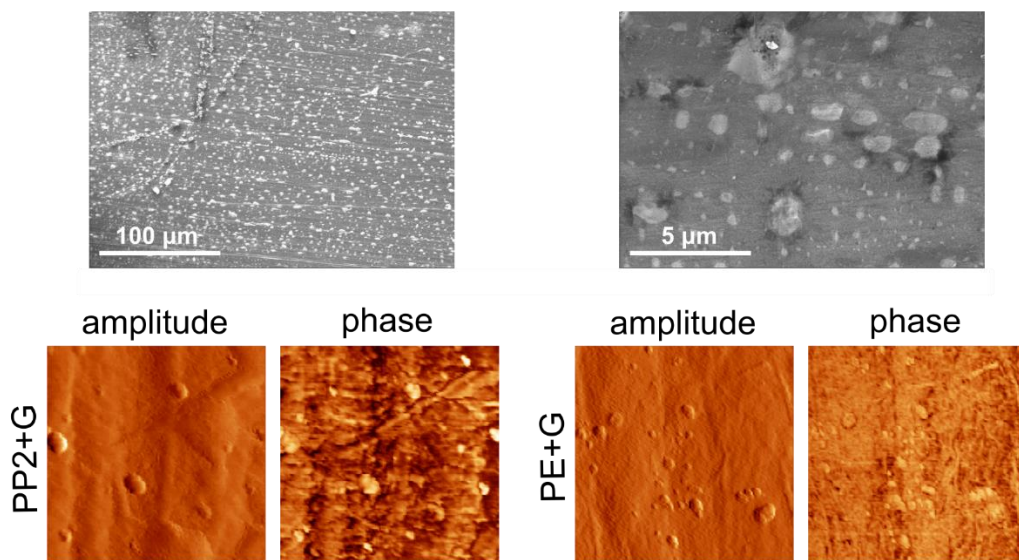
**Figure S7:** AFM amplitude and topography 30×30 μm (a) and 1×1 μm (b) images of the PP fibres before coating: first batch (PP1, left); UVO-treated first batch (PP1 UV, middle); second batch (PP2, right) and corresponding height profiles of transverse lines with respect to the extrusion axis (bottom).



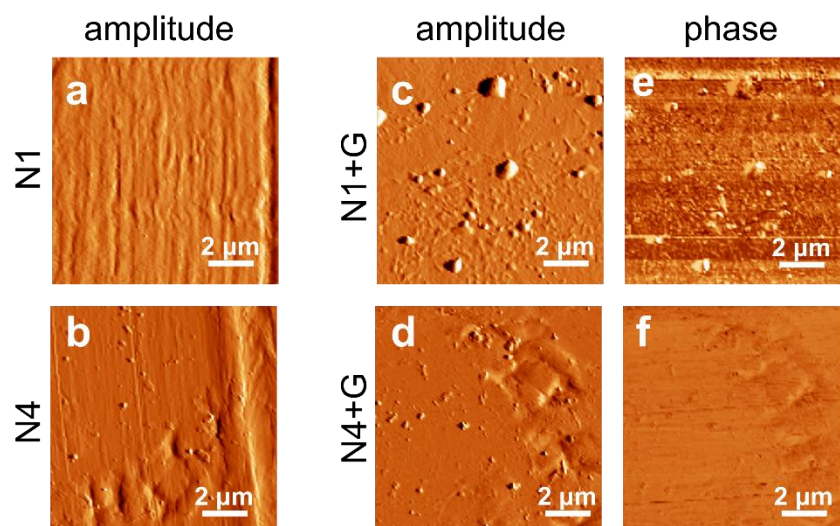
**Figure S8:** AFM topography and phase 30×30 µm (a), and 1×1 µm (b) images of the PLA fibres before coating: first batch (PLA1, left); UVO treated first batch (PLA1 UV, middle); second batch (PLA2, right) and corresponding height profiles of transverse lines with respect to the extrusion axis (bottom).



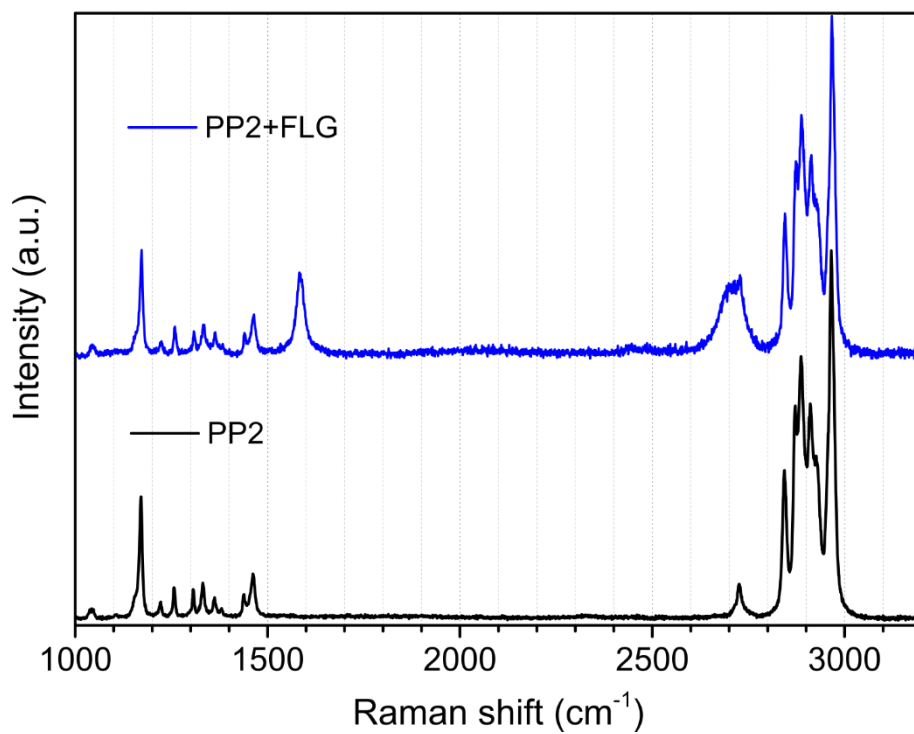
**Figure S9:** AFM topography and phase 5×5 μm images of graphene-coated (a) PP1 (2 different spots) and PP2 and (b) PLA1; PLA1 UV and PLA2 (bottom).



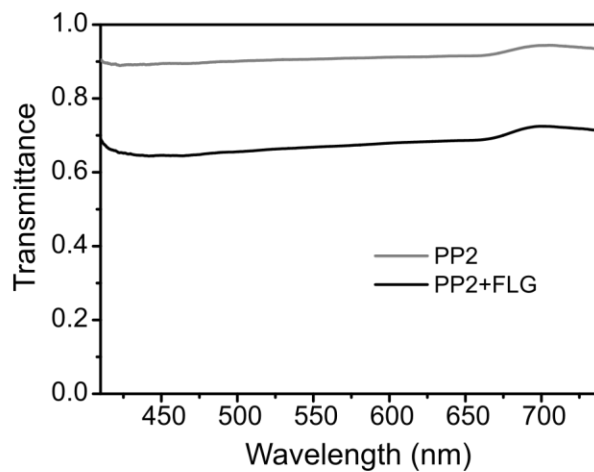
**Figure S10.** PMMA residues visible in SEM images of graphene-coated PP1 fibres (top), and in AFM images of PP2 and PE fibres (bottom).



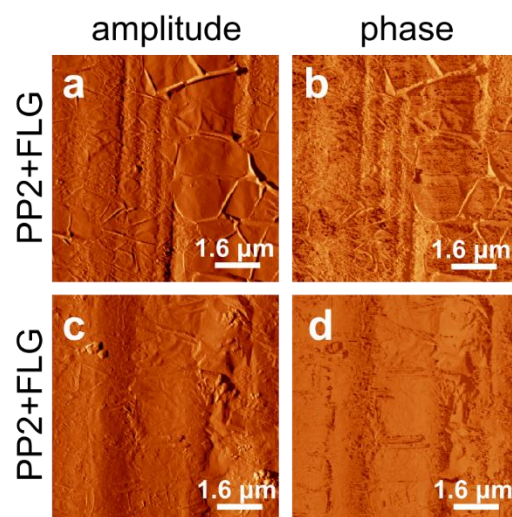
**Figure S11.** AFM amplitude images of uncoated N1 (a) and N4 (b) nylon fibres; AFM amplitude and phase images of graphene-coated N1 (c and e) and N4 (d and f) nylon fibres.



**Figure S12.** Raman spectrum of bare PP2 fibre (black) and PP2 coated with few-layer graphene (blue).



**Figure S13.** Transmittance as a function of wavelength for bare PP2 fibre (grey) and PP2 coated with few-layer graphene (black).



**Figure S14.** AFM amplitude and phase images of two different PP2 fibres covered with few-layer graphene (FLG), with **a** and **b** showing portions of the upper graphene that appeared to be cracked and lifted towards the edges, and **c** and **d** showing a smoother and more homogeneous surface.