

Surface functionalisation of detonation diamond suitable for biological applications

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Supplementary material

Thermogravimetry

The following table shows the relevant peaks in TGA. Measurements were carried out in Al₂O₃ crucibles under nitrogen atmosphere with a heating rate of 4 K min⁻¹ using a STA-429 thermobalance (Netzsch, Germany). Figure S1 shows the corresponding thermogravimetric graphs that are not present in Fig. 5.

Table S1 TGA data of functionalised nanodiamond materials

Sample	T / °C (Δm ₁) Step 1 ^a	T / °C (Δm ₂) Step 2	T / °C (Δm ₃) Step 3	T / °C (Δm ₄) Step 4	T / °C (Δm ₅) Step 5 ^b	Δm (Δm _{eff}) ^c
1	45 (-8.6 %)	-	-	-	-	-8.6 % (0 %)
2	74 (-3.4 %)	-	-	-	430 (-7.5 %)	-10.9 % (-7.8 %)
4	67 (-2.1 %)	162 (-3.5 %)	-	314 (-9.5 %)	451 (-5.9 %)	-21.0 % (-19.3 %)
5	62 (-3.0 %)	207 (-8.9 %)	-	289 (-7.0 %)	416 (-5.9 %)	-24.8 % (-22.5 %)
6	70 (-2.5 %)	172 ^d	220 (-9.5 %) ^d	294 (-6.7 %)	419 (-7.6 %)	-26.3 % (-24.3 %)
7	66 (-2.2 %)	190 (-3.9 %)	227 (-2.11 %)	314 (-6.1 %)	429 (-7.5 %)	-21.7 % (-19.9 %)
8	66 (-0.9 %)	176 (-2.0 %)	-	295 (-6.3 %)	416 (-6.1 %)	-15.3 % (-14.5 %)
9	76 (-2.4 %)	201 (-0.7 %)	318 (-6.1 %)	374 (-2.3 %)	415 (-3.7 %)	-15.2 % (-13.1 %)

^a desorption of surface bound water, ^b removal of the silane groups, ^c Δm: weight loss including water desorption, Δm_{eff}: weight loss without water desorption, normalised on remaining functionalised nanodiamond, ^d combined weight loss of unresolvable peaks.

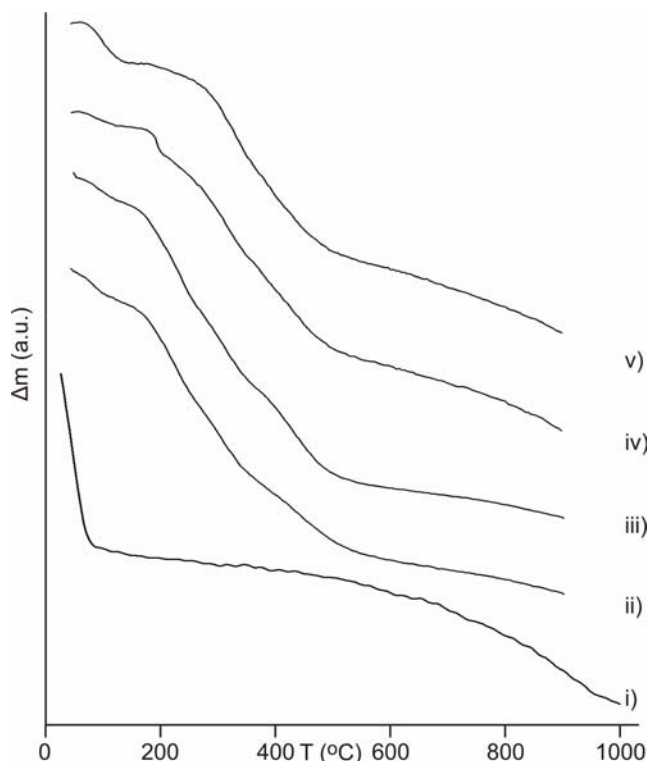


Fig. S1 Thermogravimetric analysis of i) ND-OH, ii) ND-O-Si(OMe)₂-(CH₂)₃-NH-Ser-Fmoc, iii) ND-O-Si(OMe)₂-(CH₂)₃-NH-Phe-Fmoc, iv) ND-O-Si(OMe)₂-(CH₂)₃-NH-Gly-Phe-Gly-Fmoc; v) ND-O-Si(OMe)₂-(CH₂)₃-NH-Gly-Phe-Gly-Phe-Fmoc

Particle size distribution

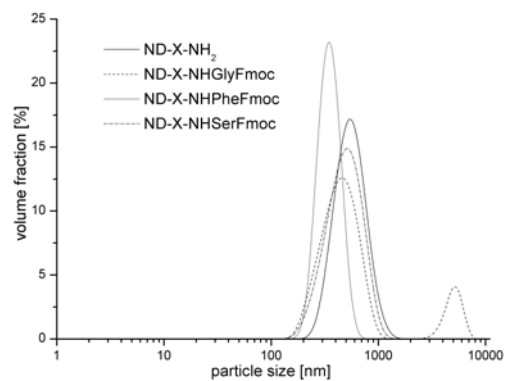


Fig. S2 Particle size distribution of amino acid functionalised silanised nanodiamond materials ($X = -(\text{CH}_3\text{O})_2\text{Si}-(\text{CH}_2)_3-$).