Supporting Information

Tuning TiO_2 nanoparticle morphology in graphene–TiO_2 hybrids by graphene surface modification.

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This document contains a plot of the D:G ratio observed on Raman spectra of all the samples presented in the paper (Fig. S1) and the statistical analysis of these data (Table S1), the relative amounts of the carbon, titanium and oxygen species determined by high resolution XPS for the hybrid GNP-TiO_2 samples (Fig. S2), as well as extra TEM micrographs of GNP-TiO_2 (Fig. S3), COOH-GNP-TiO_2 (Fig. S4) and NH_2-GNP-TiO_2 (Fig.S5).

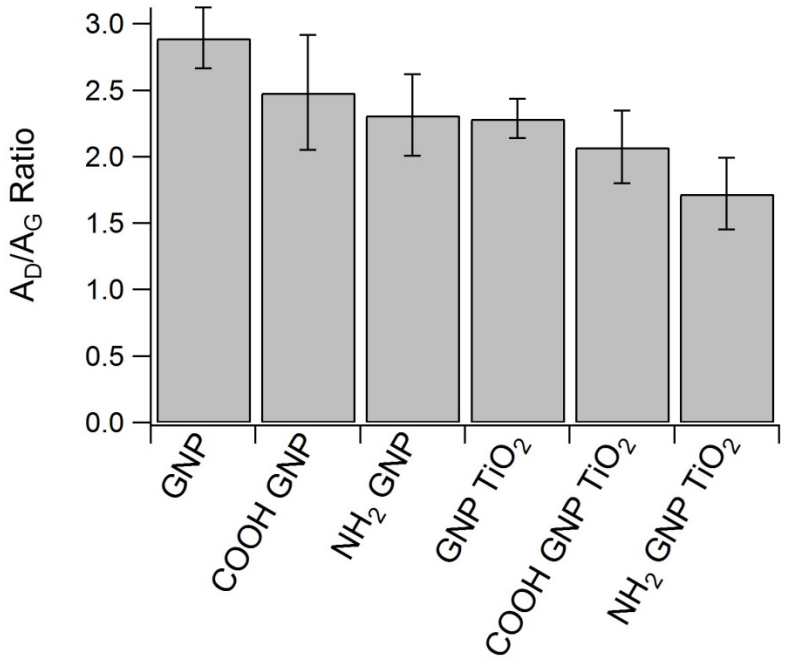

Fig. S1 A_D:A_G ratio with 90% confidence intervals for pristine GNP, functionalized GNPs and GNP–TiO2 hybrids

Table S1: A_D:A_G ratio, standard deviation S and number of spectra evaluated N for pristine GNP, functionalized GNPs and GNP–TiO_2 hybrids. The P value obtained by t-test and ANOVA are also reported

	GNP	COOH–GNP	NH_2–GNP	GNP–TiO_2	COOH–GNP–TiO_2	NH_2–GNP–TiO_2
A_D:A_G ratio	2.89	2.48	2.31	2.29	2.07	1.72
S (%)	12	15	11	6.7	10	13
N	8	10	4	5	8	4
t-test P value with GNP	-	0.028 Reject H_0	0.014 Reject H_0	$3.5\ 10^{-3}$ Reject H_0	0.014* Reject H_0	0.014* Reject H_0
ANOVA P value	0.020 Reject H_0			-		
ANOVA P value	2.6 10-6 Reject H_0					

* t-test perfomed between COOH–GNP and COOH–GNP–TiO_2

** t-test perfomed between NH_2–GNP and NH_2–GNP–TiO_2

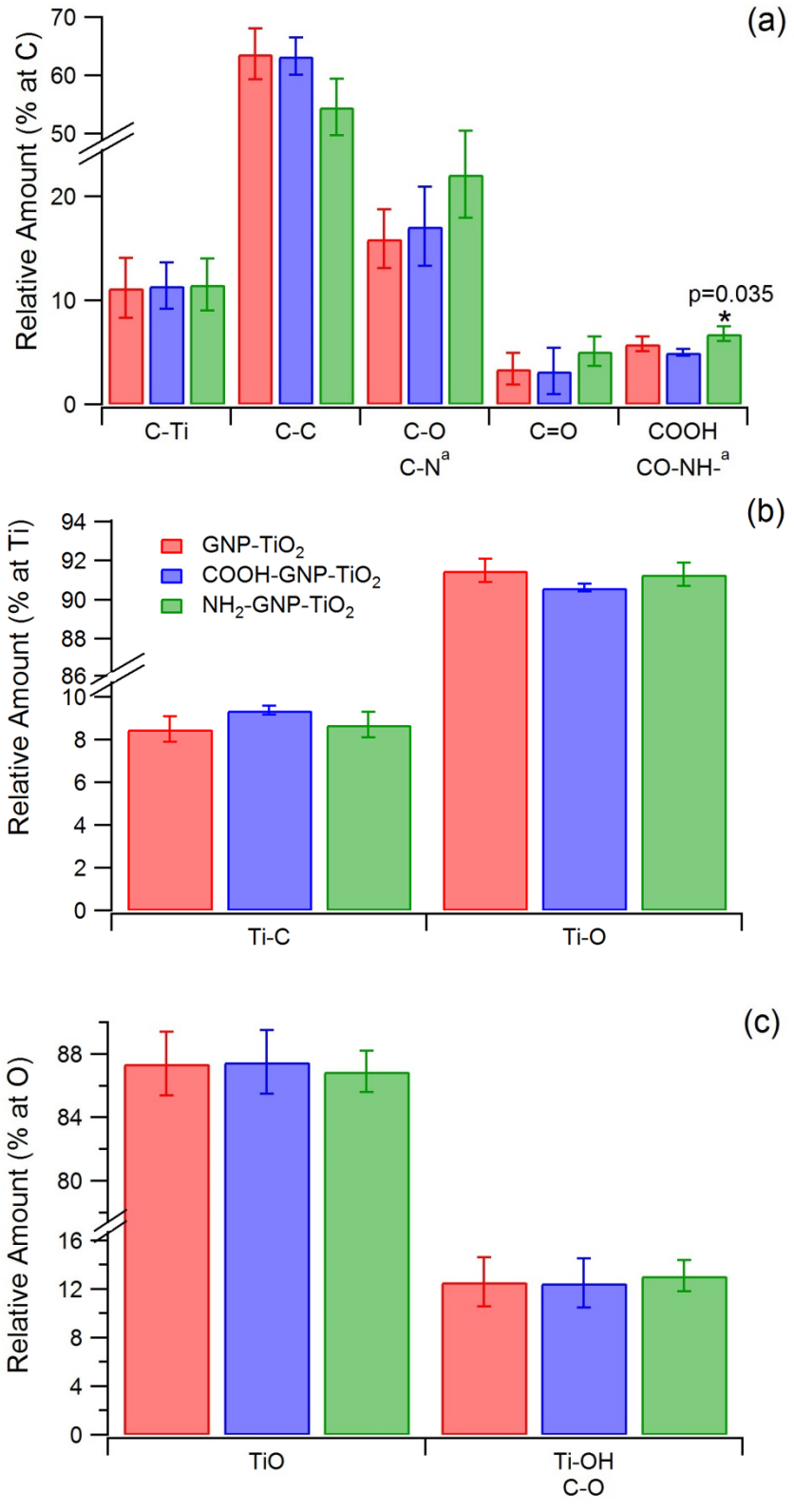

Figure S2: Relative amounts of the C (a), Ti (b) and O (O) species determined by high resolution XPS for GNP-TiO_2, NH_2–GNP-TiO_2 and COOH–GNP-TiO_2 samples. The bars marked with stars are significantly different with respect to GNP-TiO_2, the t-test p value is reported on top. The groups marked with "a" are only present on the NH2-GNP-TiO_2 sample.

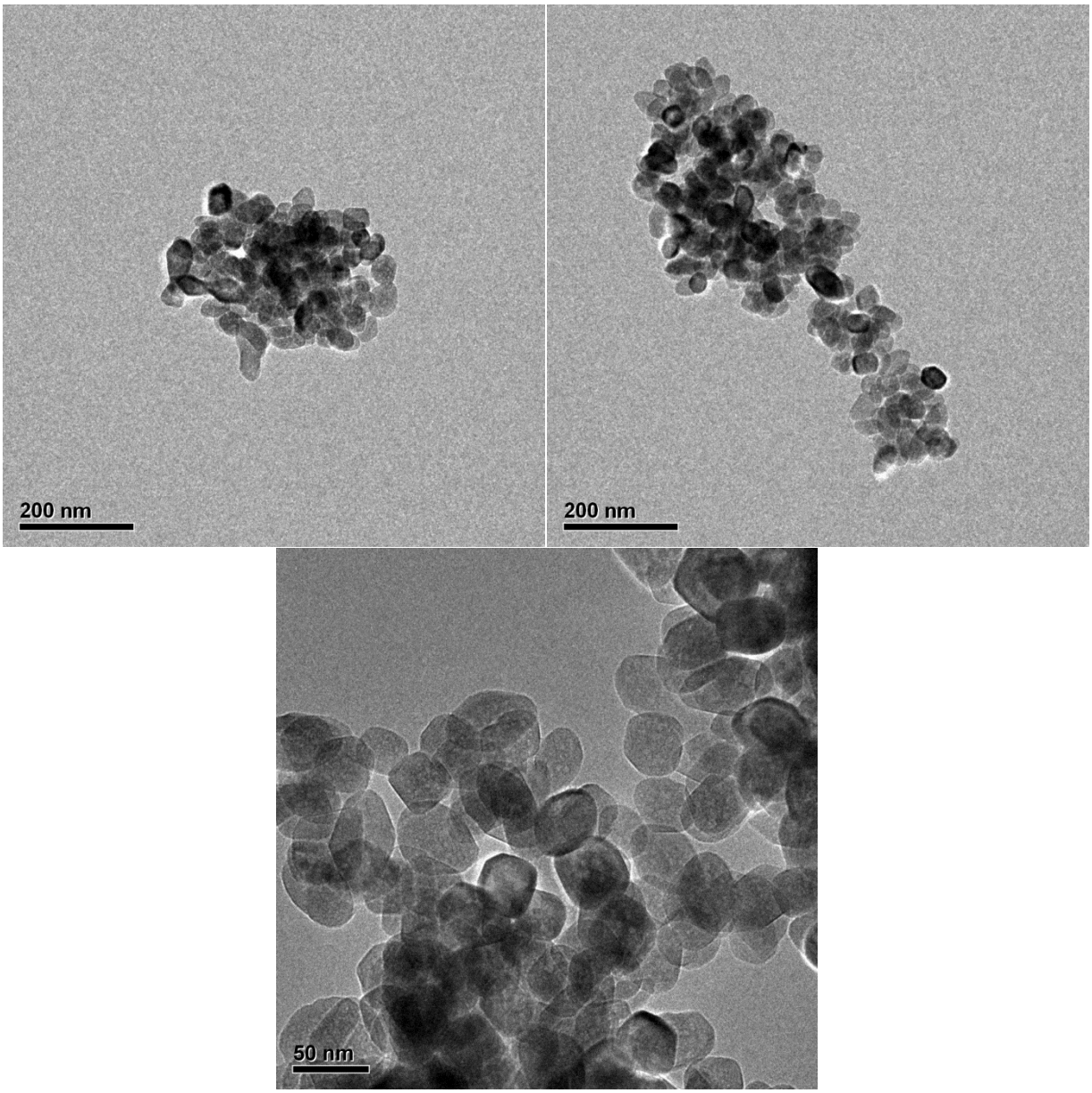

Fig. S3 TEM micrographs of the GNP-TiO_2 sample, showing TiO_2-NPs arising from homogeneous nucleation and not bound to GNP

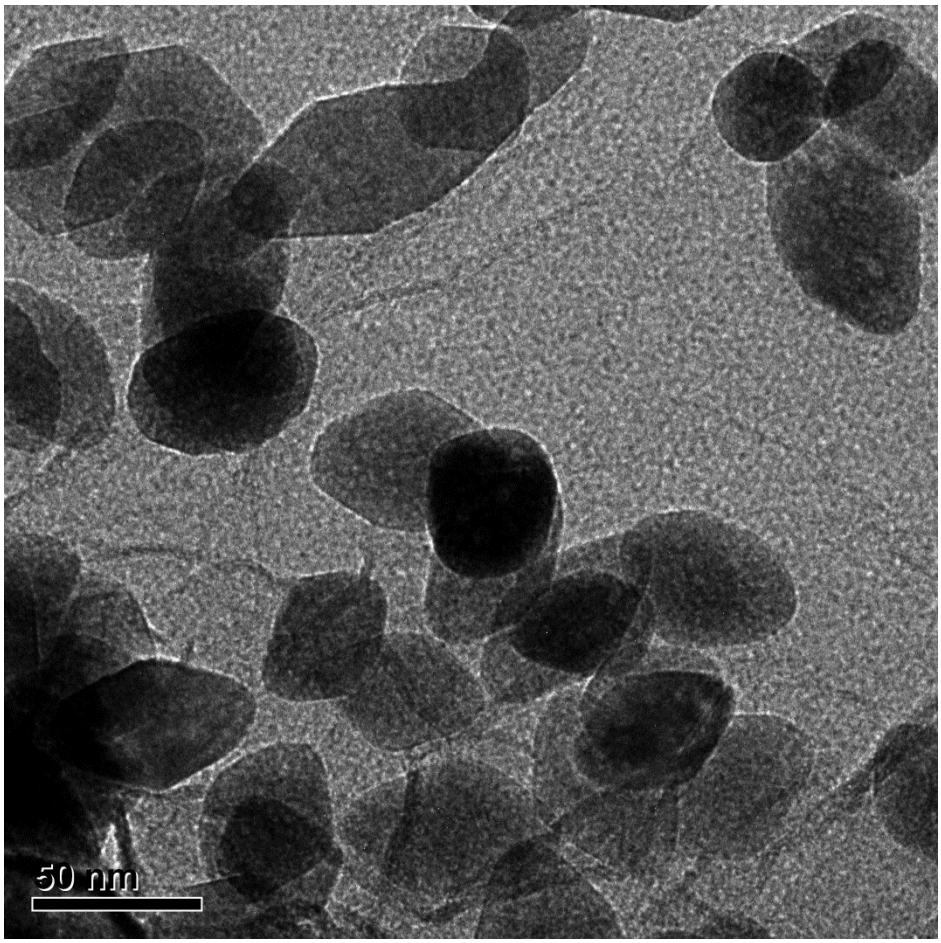

Fig. S4 TEM micrograph of the COOH-GNP-TiO2 sample, showing truncated bypiramid shaped particles

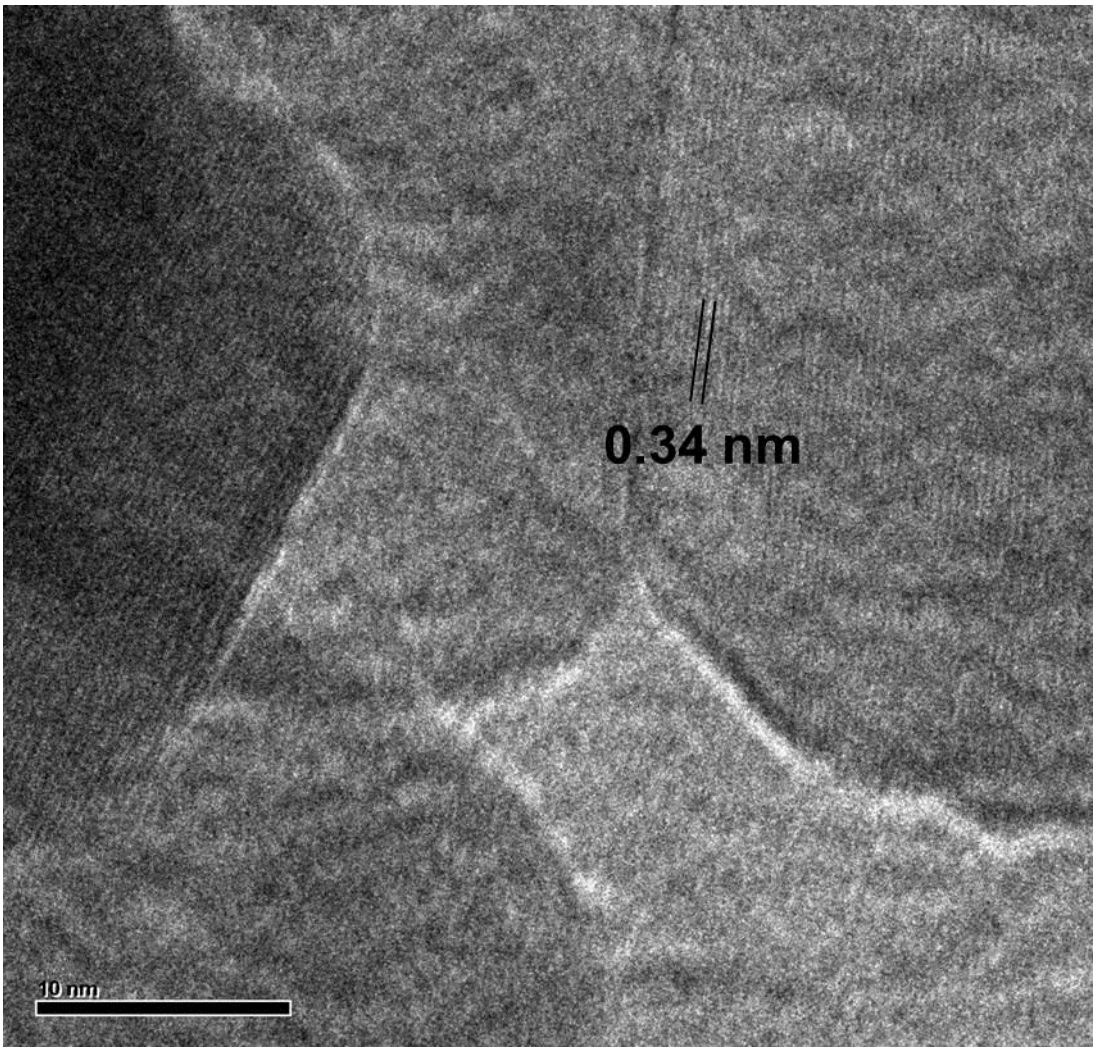

Fig. S5 High resolution TEM micrograph of the NH_2-GNP-TiO_2 sample