Electronic Supplementary Material (ESI) for Nanoscale.

Supporting information

Large-scale synthesis of 2D-Silica (SiO_x) nanosheets using Graphene oxide (GO) as a template material

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Table S1. Compositions of the reaction mixtures used in all reactions.

Sample name	2-propanol (ml)	APTES (ml)	TEOS (ml)	GO (ml)	MQw (ml)	Ammonia (ml)
Reference High APTES	71.37	10	-	-	18,53	0.1
Reference High TEOS	71.37	-	10	-	18.53	0.1
Low APTES Coated GO	81.36	0.01	-	18.53	-	0.1
Medium APTES Coated GO	81.27	0.1	-	18.53	-	0.1
High APTES Coated GO	71.37	10	-	18.53	-	0.1
Low TEOS Coated GO	81.36	-	0.01	18.53	-	0.1
Medium TEOS Coated GO	81.27	-	0.1	18.53	-	0.1
High TEOS Coated GO	71.37	-	10	18.53	-	0.1

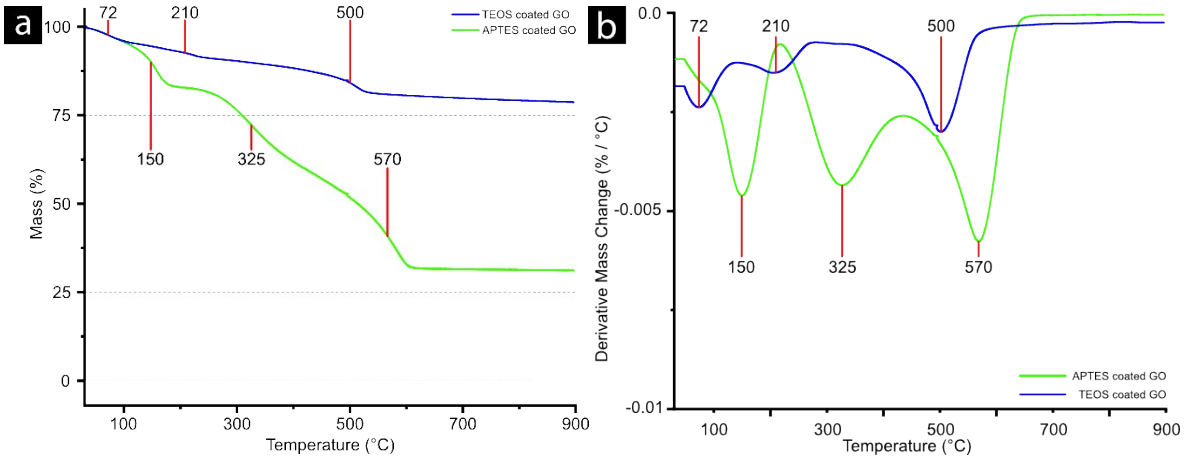


Fig. S1. TGA curves for TEOS coated GO and APTES coated GO (a), and their respective mass change derivative (b). The highlighted temperatures correspond to the temperature where the maximum mass loss rate occurs.

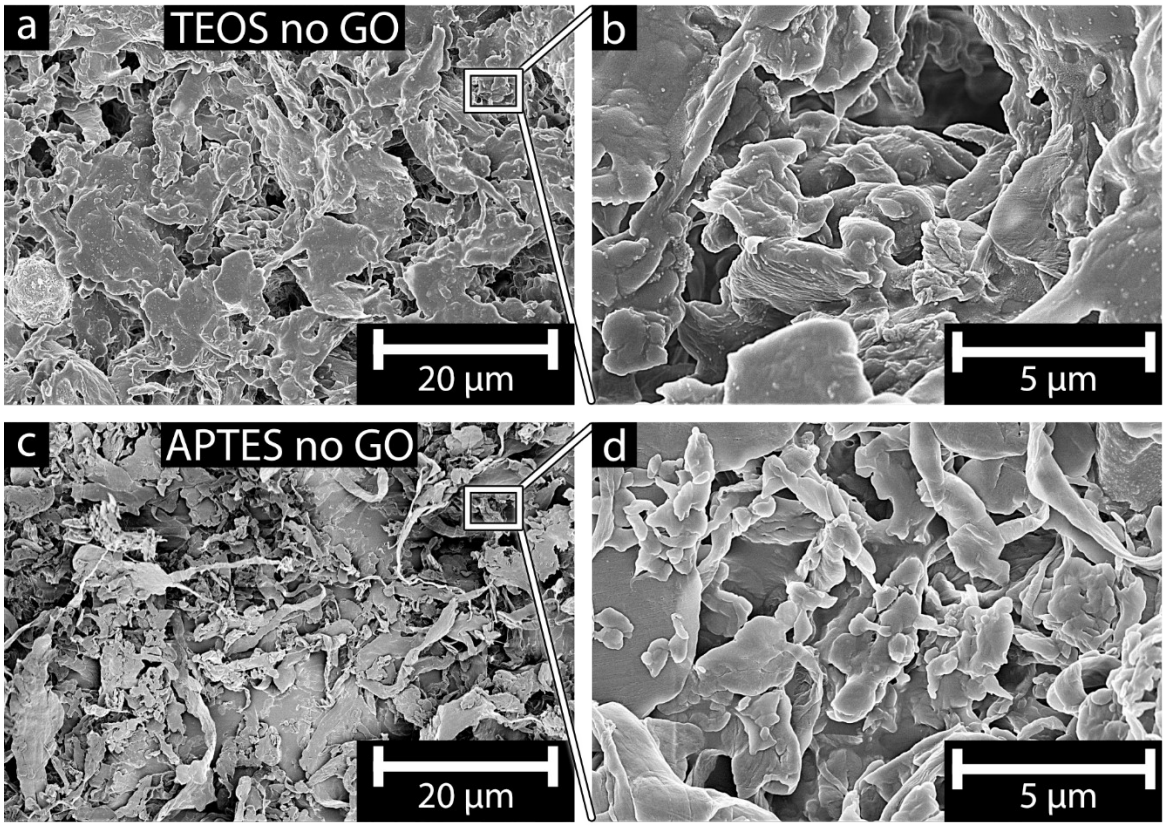
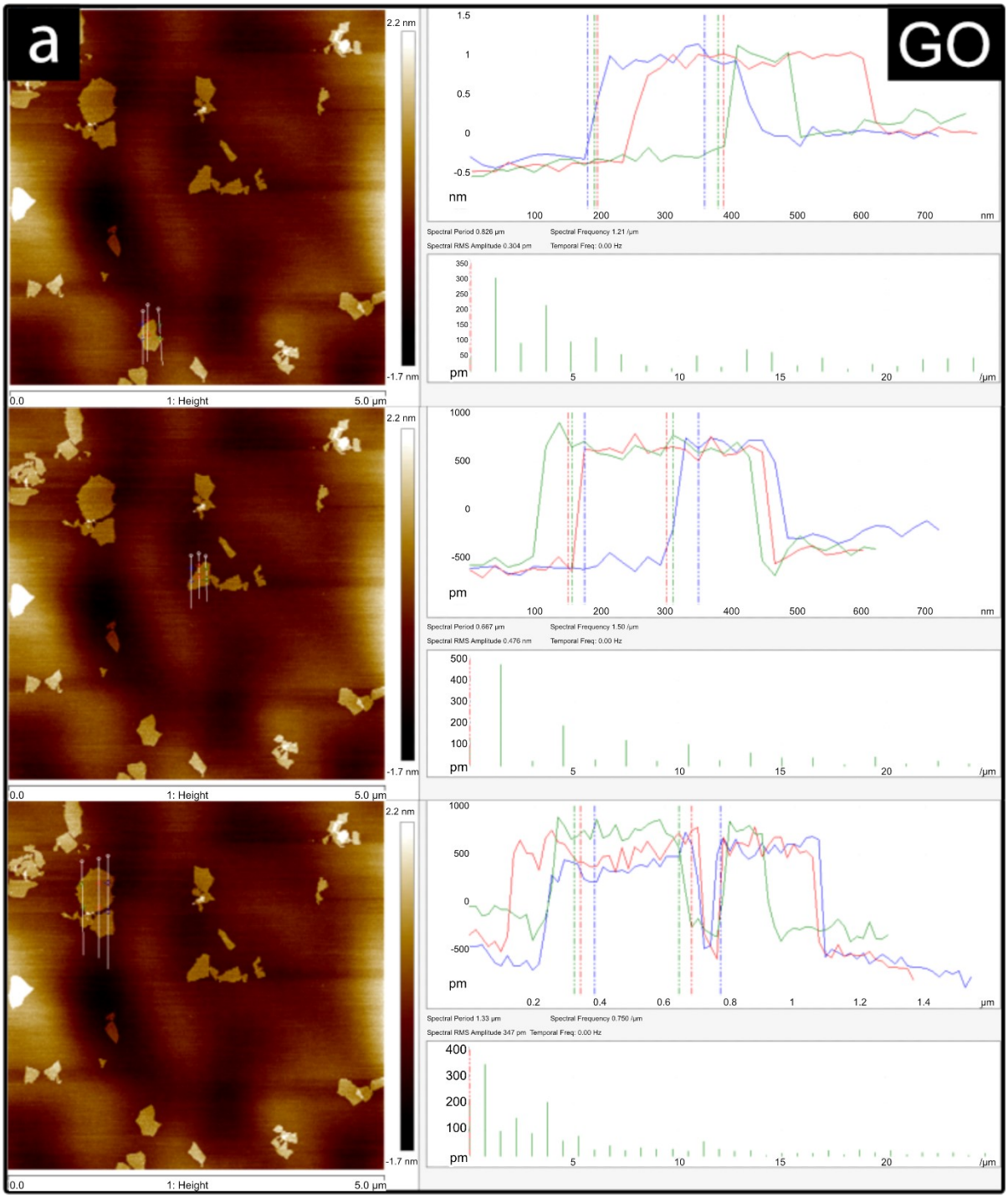
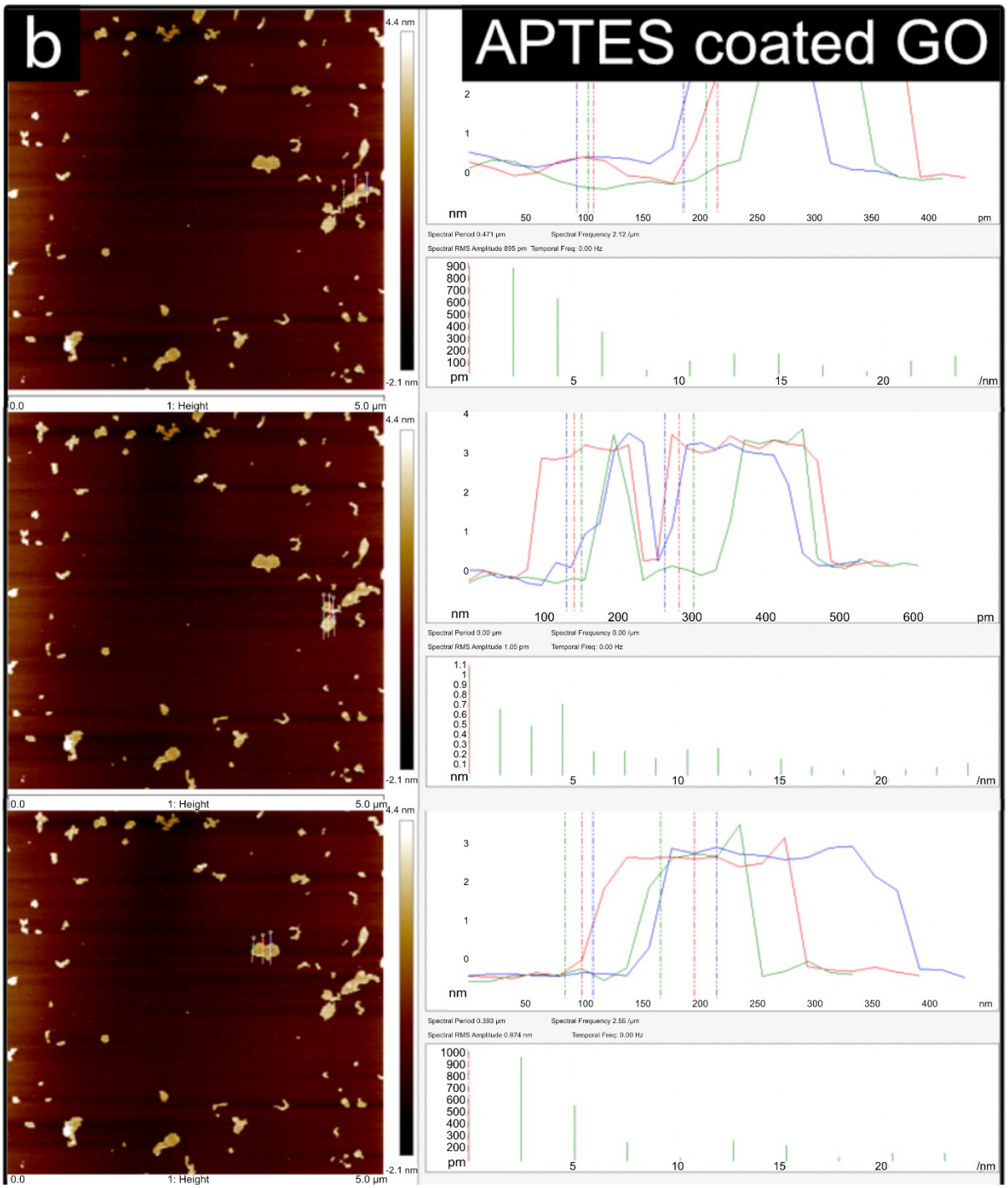
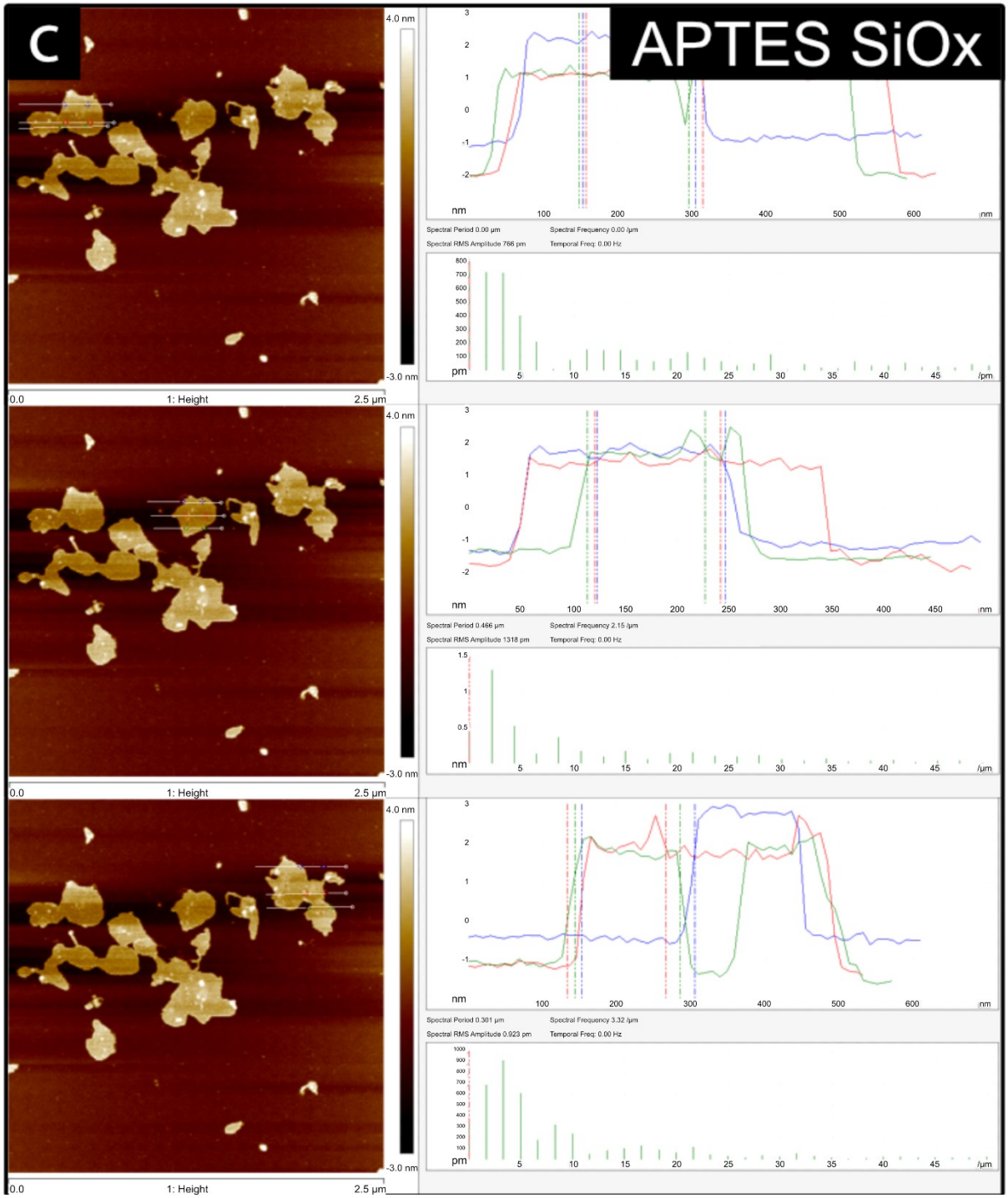
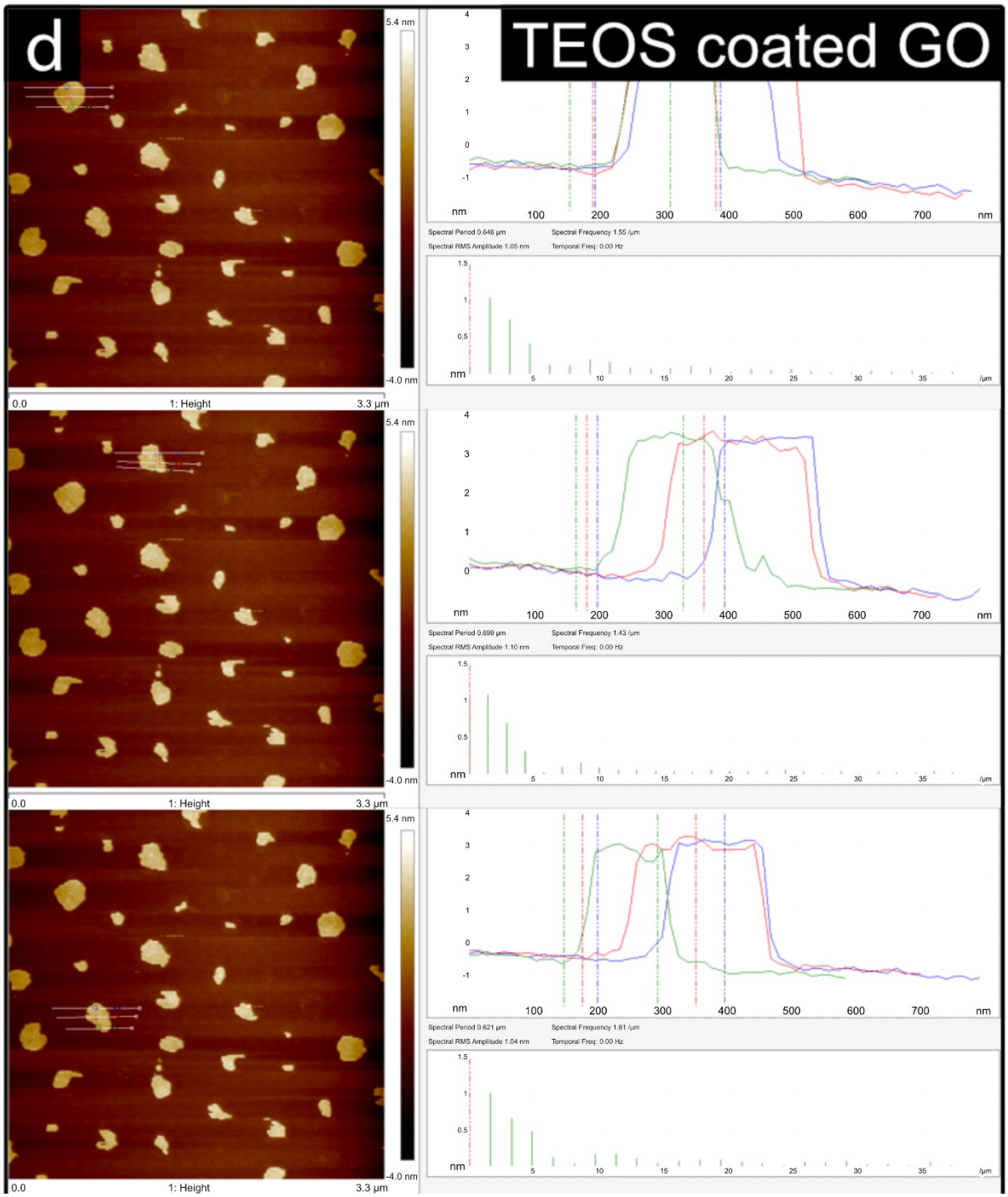


Fig. S2. Micrographs of material obtained from the condensation reaction using TEOS (a and b), and APTES (c and d), without the presence of a GO template, insets do not represent the shown magnified area.


a
GO
2.2 nm
-1.7 nm
0.0
1: Height
5.0 µm
nm
pm
µm
Spectral Period 0.826 µm
Spectral Frequency 1.21 /µm
Spectral RMS Amplitude 0.304 pm
Temporal Freq: 0.00 Hz
Spectral Period 0.667 µm
Spectral Frequency 1.50 /µm
Spectral RMS Amplitude 0.476 nm
Temporal Freq: 0.00 Hz
Spectral Period 1.33 µm
Spectral Frequency 0.750 /µm
Spectral RMS Amplitude 347 pm
Temporal Freq: 0.00 Hz


b
APTES coated GO
4.4 nm
-2.1 nm
0.0
1: Height
5.0 µm
nm
pm
/nm
Spectral Period 0.471 µm
Spectral Frequency 2.12 /µm
Spectral RMS Amplitude 895 pm
Temporal Freq: 0.00 Hz
Spectral Period 0.00 µm
Spectral Frequency 0.00 /µm
Spectral RMS Amplitude 1.05 pm
Temporal Freq: 0.00 Hz
Spectral Period 0.393 µm
Spectral Frequency 2.56 /µm
Spectral RMS Amplitude 0.974 nm
Temporal Freq: 0.00 Hz


C
APTES SiOx
4.0 nm
-3.0 nm
0.0
1: Height
2.5 µm
nm
pm
Spectral Period 0.00 µm
Spectral Frequency 0.00 /µm
Spectral RMS Amplitude 766 pm
Temporal Freq: 0.00 Hz
Spectral Period 0.466 µm
Spectral Frequency 2.15 /µm
Spectral RMS Amplitude 1318 pm
Temporal Freq: 0.00 Hz
Spectral Period 0.301 µm
Spectral Frequency 3.32 /µm
Spectral RMS Amplitude 0.923 pm
Temporal Freq: 0.00 Hz


d
TEOS coated GO
5.4 nm
-4.0 nm
0.0
1: Height
3.3 µm
nm
100
200
300
400
500
600
700
Spectral Period 0.646 µm
Spectral Frequency 1.55 /µm
Spectral RMS Amplitude 1.05 nm
Temporal Freq: 0.00 Hz
Spectral Period 0.699 µm
Spectral Frequency 1.43 /µm
Spectral RMS Amplitude 1.10 nm
Temporal Freq: 0.00 Hz
Spectral Period 0.621 µm
Spectral Frequency 1.61 /µm
Spectral RMS Amplitude 1.04 nm
Temporal Freq: 0.00 Hz
/µm

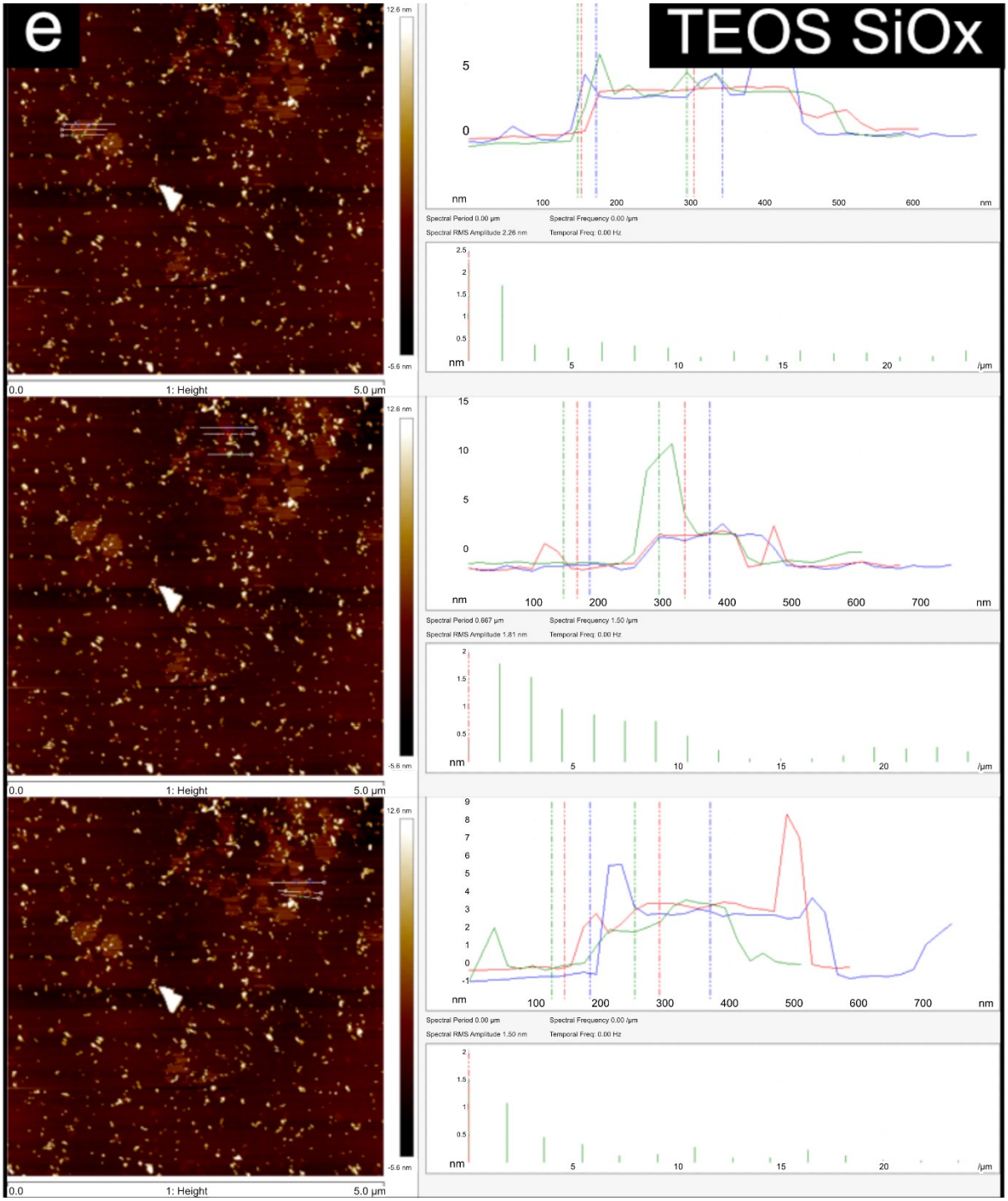


Fig. S3. AFM images used for thickness determination.

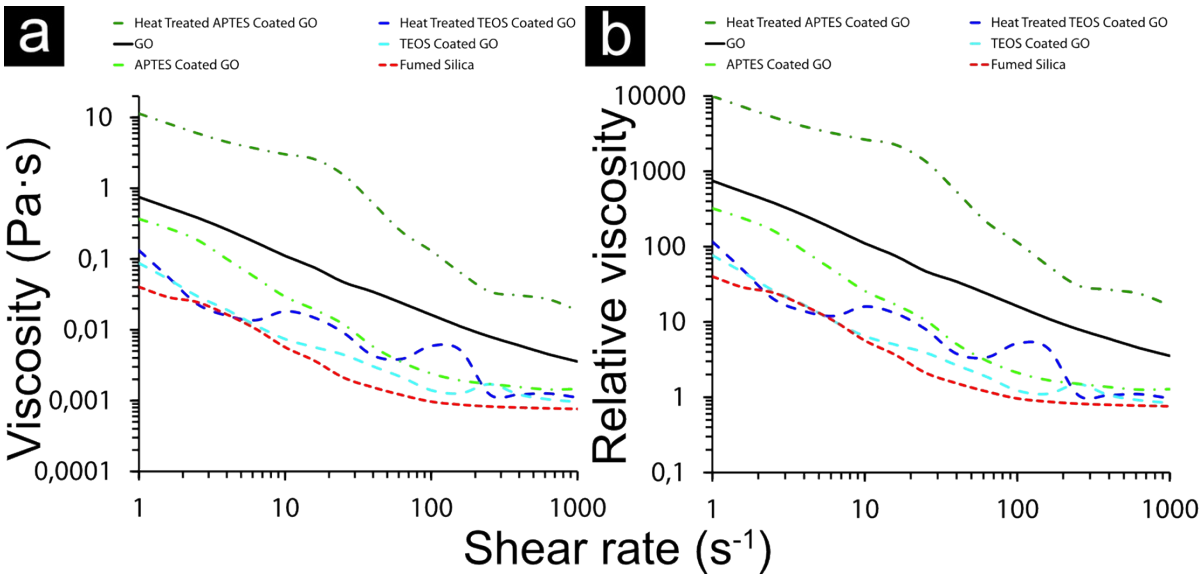


Fig. S4. Rheological data for 0.5 wt.% suspensions using single measurements. Untreated viscosity data (a), and relative viscosity (accounting for solvent present in suspension) (b).

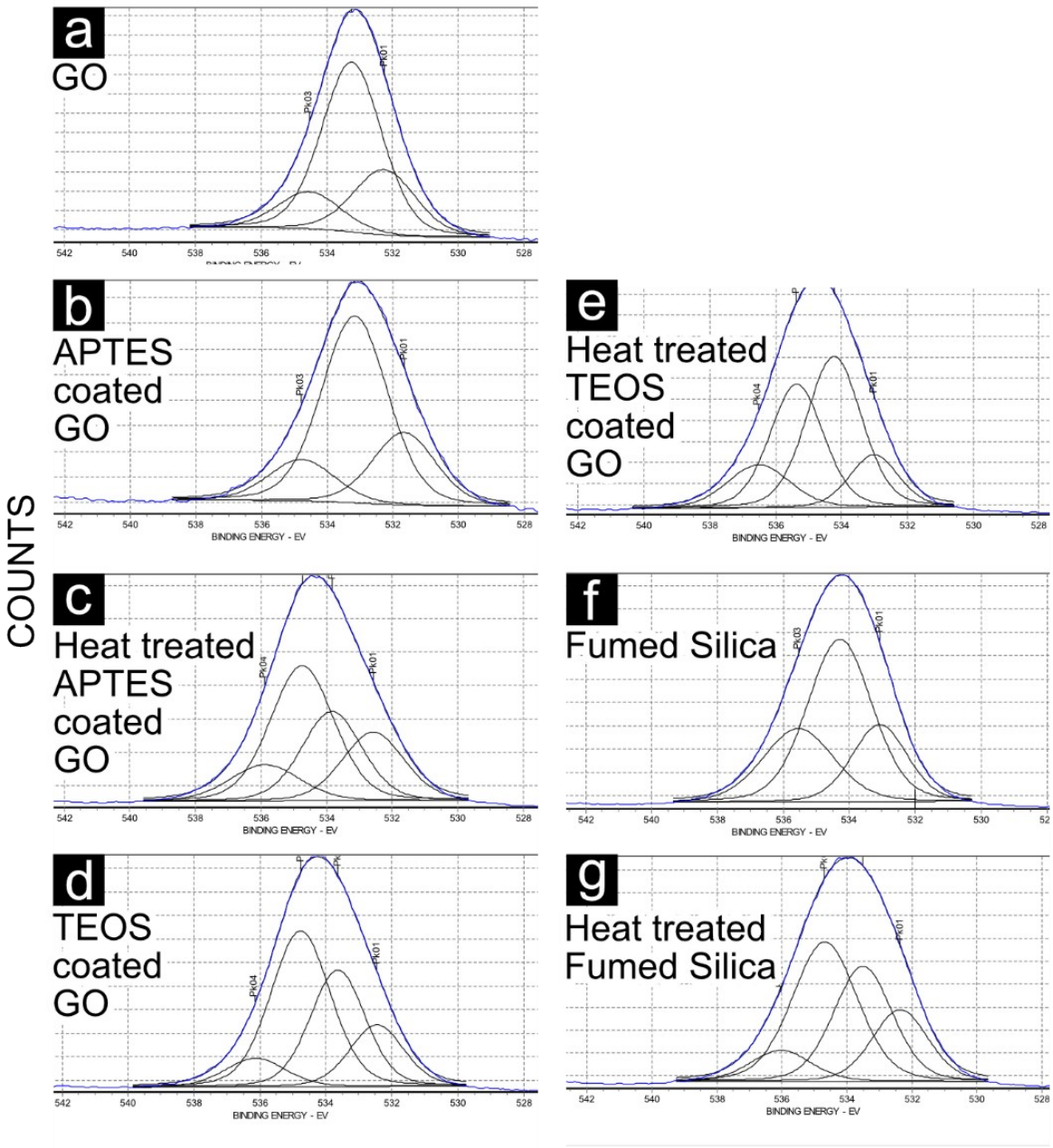


Fig. S5 O 1s XPS spectra for GO (a), silane coated GO (b, and d), heat treated silane coated GO (586 °C) (c, and e), and Fumed silica pre and post heat treatment (586 °C) (f-g).

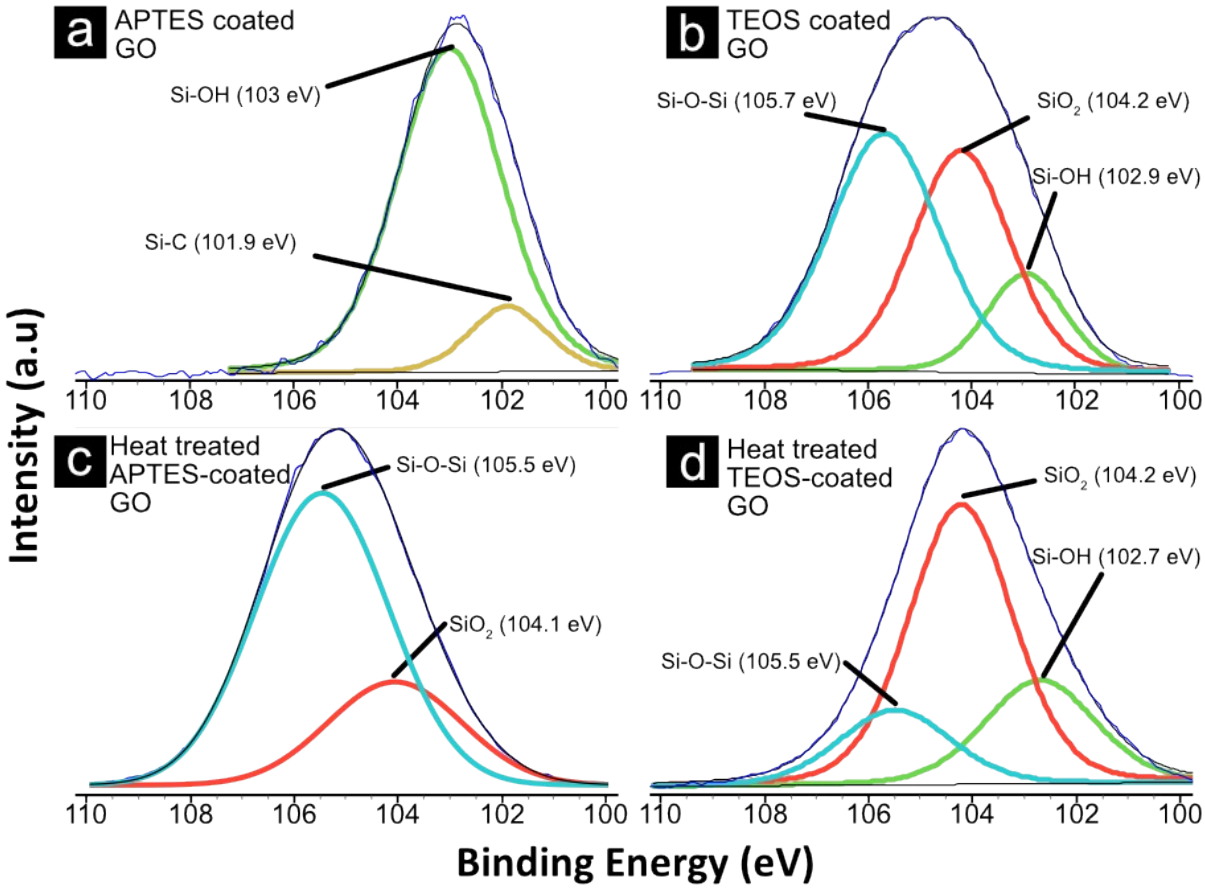


Fig. S6 Si 2p XPS for APTES coated GO (a), TEOS coated GO (b), heat treated APTES and TEOS coated GO (586 °C) (c, and d).

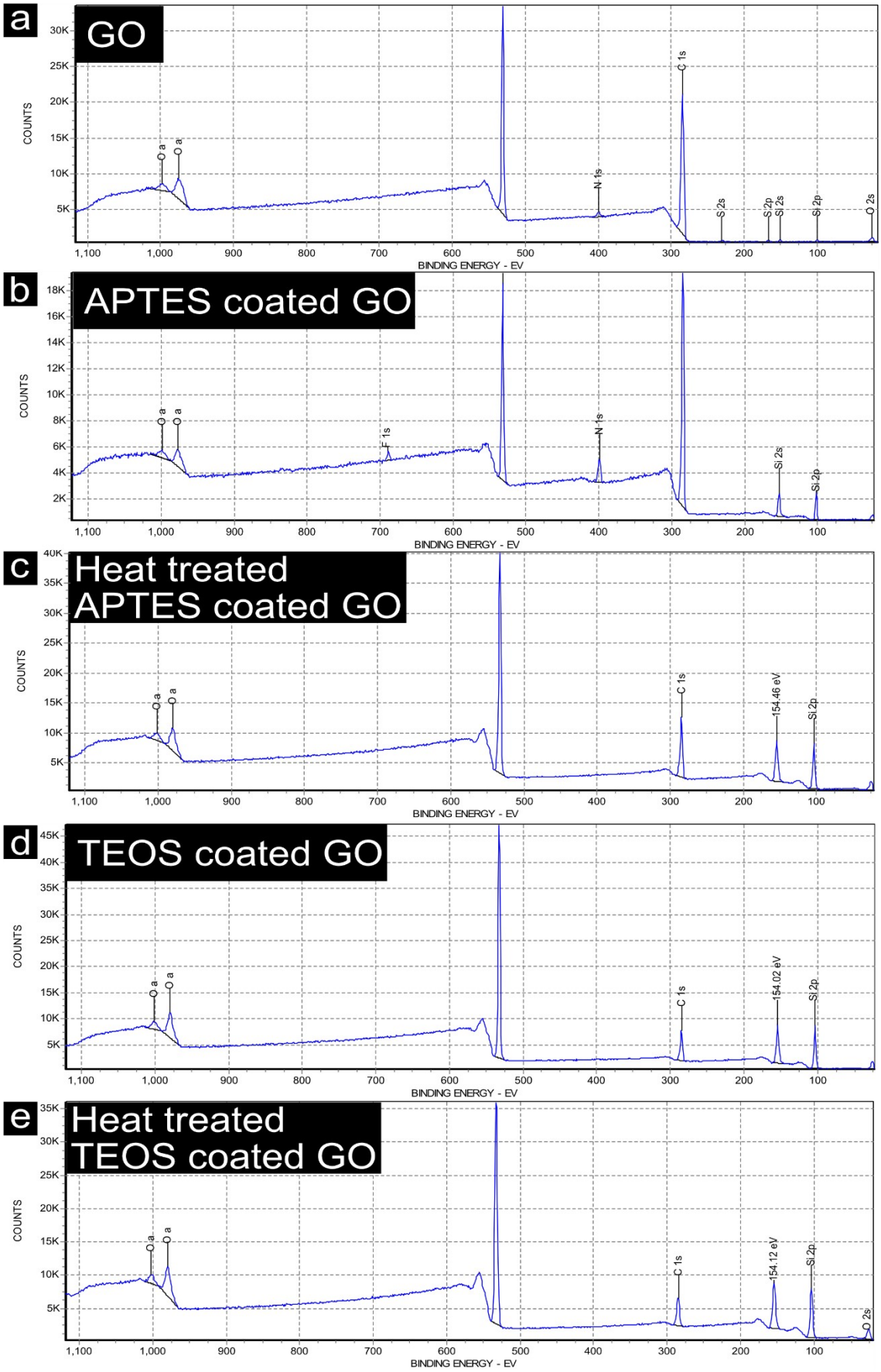


Fig. S7 High resolution survey XPS spectra of investigated materials. GO (a), silane coated GO (b, and d), and heat treated silane coated GO (586 °C) (c, and e).

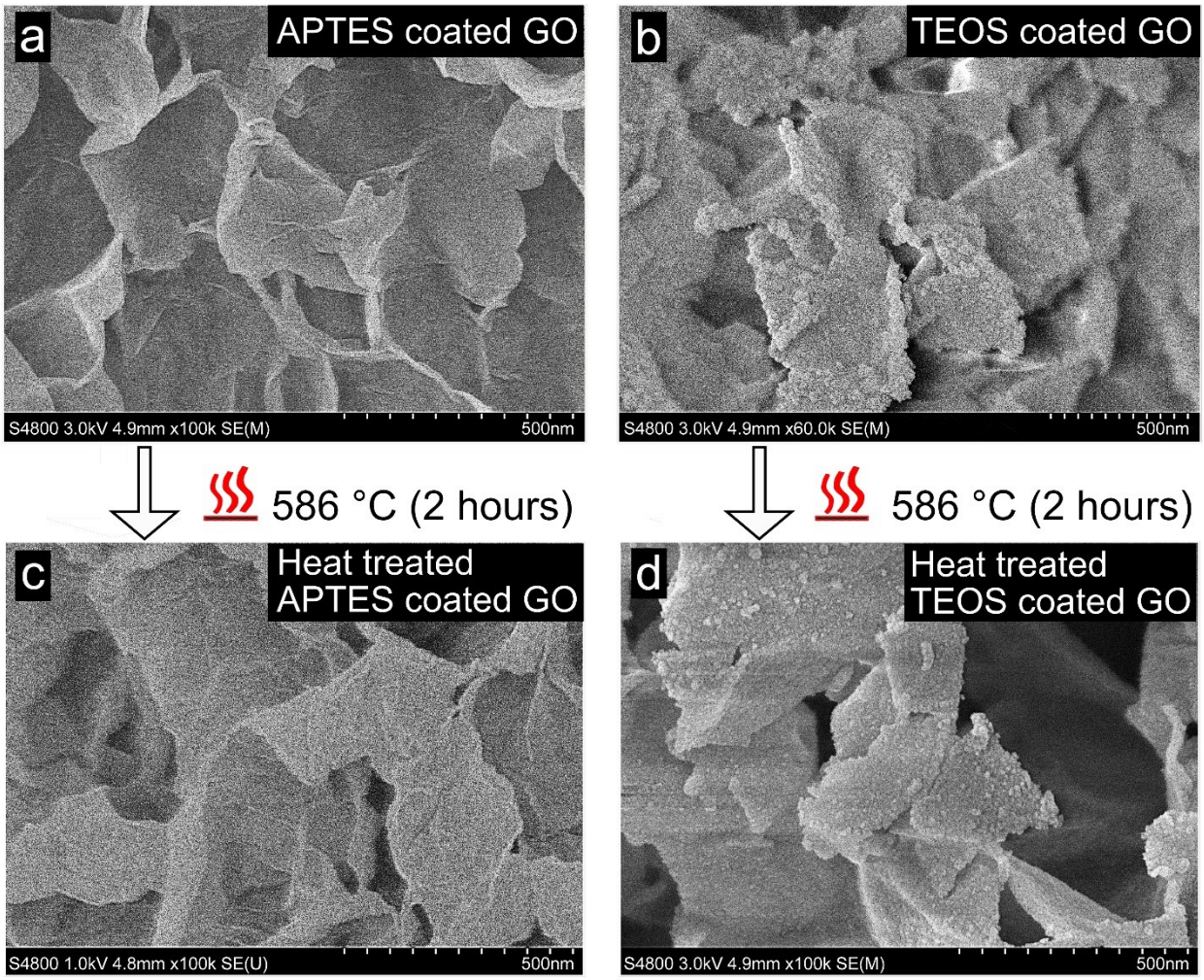


Fig. S8 High resolution SEM images showing APTES coated GO and TEOS coated GO pre heat treatment (a and b respectively), and Post heat treatement (c and d repsectivly). Fig. 9 b and d (TEOS) highlight the more grainy surface structure as compared to Fig. 9 a and c (APTES).