Electronic Supplementary Material (ESI) for RSC Advances.
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ELECTRONIC SUPPORTING INFORMATION FOR:

Exfoliation of graphite and graphite oxide in water by chlorin e_6

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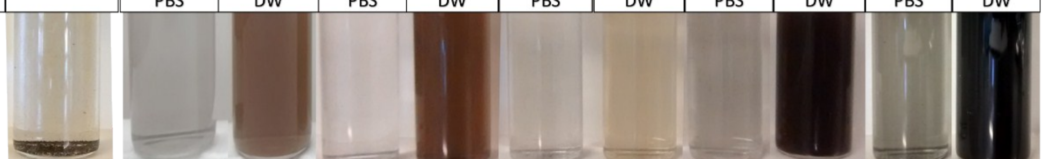
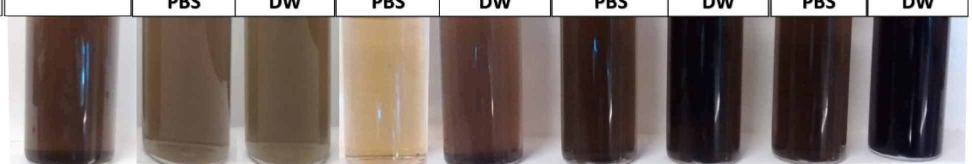
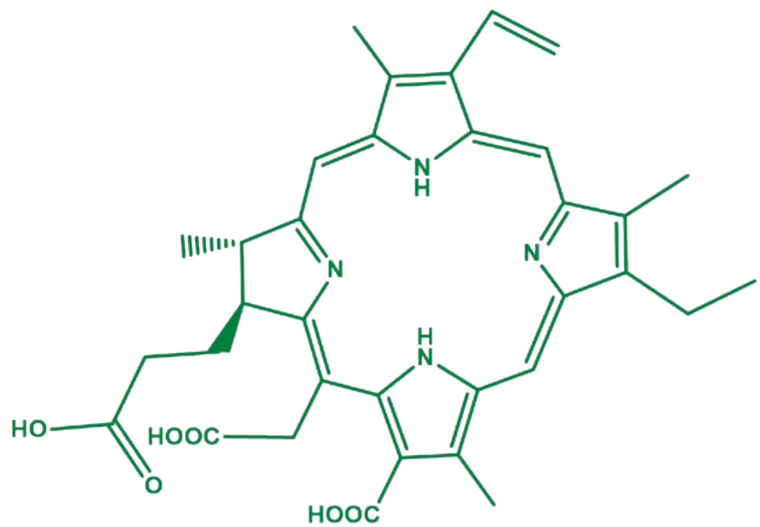
Initial concentrations (mg/ml)	Ce_6 0 mg/ml Graphite 1 mg/ml	*Ce_6 0.2 mg/ml *Graphite 0.1 mg/ml		E1 Ce_6 1 mg/ml Graphite 0.1 mg/ml		E2 Ce_6 0.2 mg/ml Graphite 1 mg/ml		E3 Ce_6 1 mg/ml Graphite 1 mg/ml		E4 Ce_6 5 mg/ml Graphite 1 mg/ml	
Final FLG (mg/ml)	-----	0.01	0.02	0.02	0.01	0.003	0.001	0.005	0.1	0.03	0.06
Sample	Graphite	*FLG-Ce_6 PBS	*FLG-Ce_6 DW	FLG-Ce_6 PBS	FLG-Ce_6 DW	FLG-Ce_6 PBS	FLG-Ce_6 DW	FLG-Ce_6 PBS	FLG-Ce_6 DW	FLG-Ce_6 PBS	FLG-Ce_6 DW
											
Final Ce_6 (mg/ml)	-----	0.001	0.02	0.001	0.08	0.0006	0.001	0.0005	0.4	0.005	0.9

Initial concentrations (mg/ml)	Ce_6 0 mg/ml GO 1 mg/ml	*Ce_6 0.2 mg/ml *GO 0.1 mg/ml		E1 Ce_6 1 mg/ml GO 0.1 mg/ml		E2 Ce_6 0.2 mg/ml GO 1 mg/ml		E3 Ce_6 1 mg/ml GO 1 mg/ml	
Final GO (mg/ml)	1	0.02	0.05	0.02	0.06	0.01	0.07	0.1	0.1
Sample	GO	*GO-Ce_6 PBS	*GO-Ce_6 DW	GO-Ce_6 PBS	GO-Ce_6 DW	GO-Ce_6 PBS	GO-Ce_6 DW	GO-Ce_6 PBS	GO-Ce_6 DW
									
Ce_6 final (mg/ml)	----	0.01	0.01	0.04	0.04	0.03	0.04	0.04	0.07

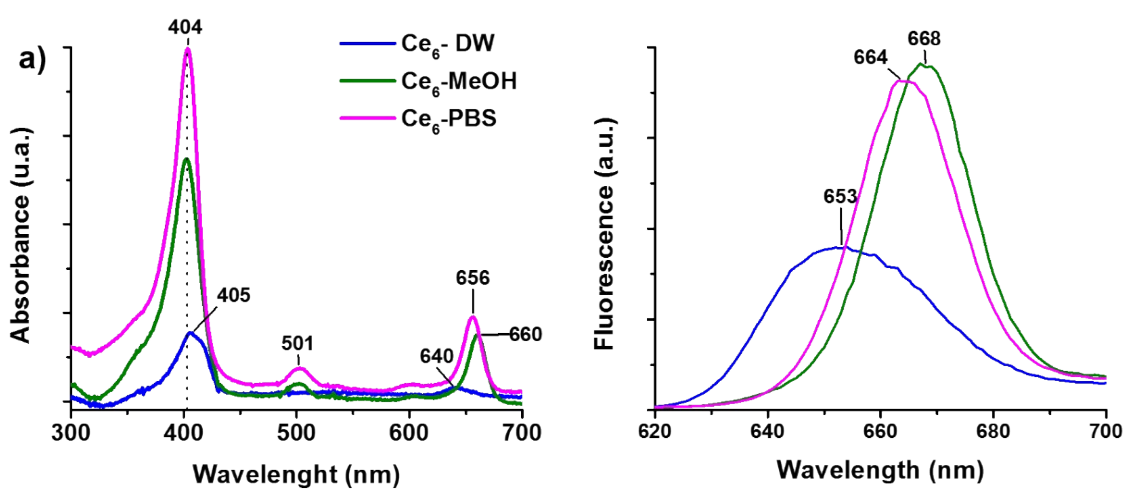
*Conditions reported in the main text

SI-1.

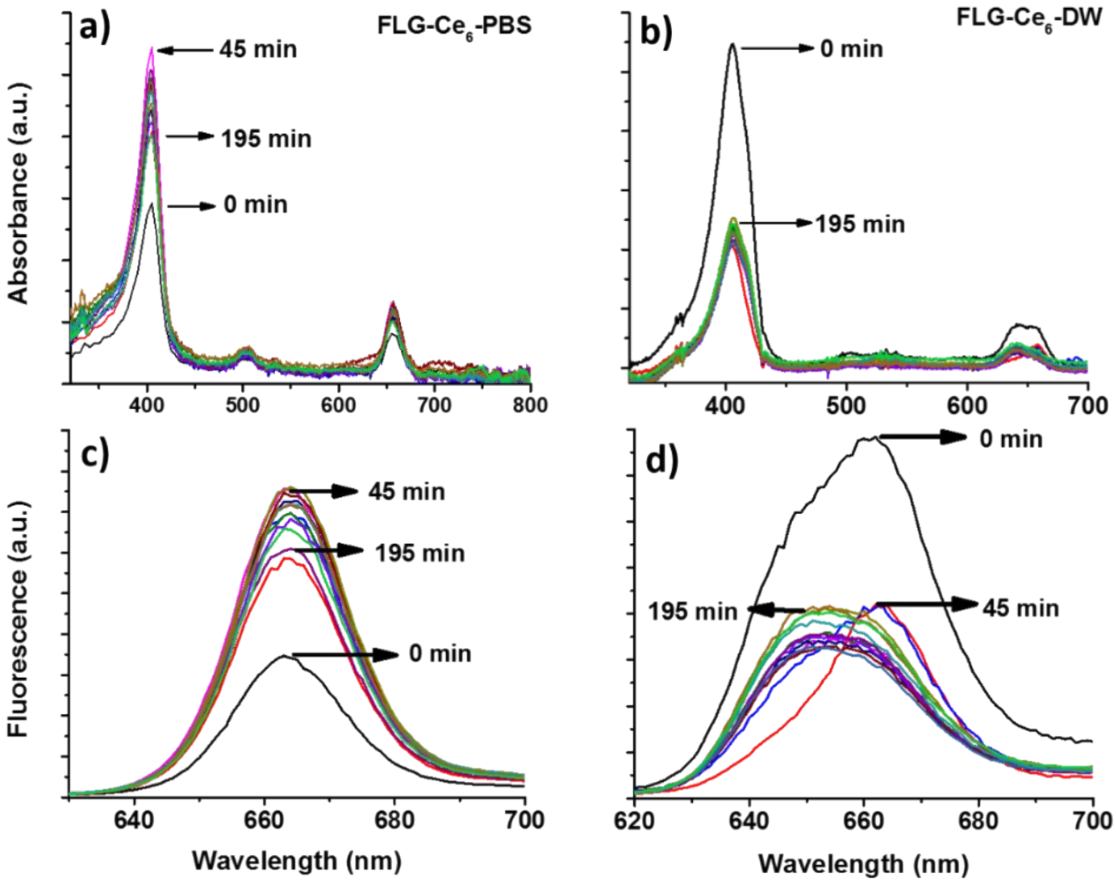
SI. Representative images of the final dispersions obtained in different set of experiments with different concentrations of Ce_6, graphite or graphite oxide. The exfoliation of graphite was not observed without the presence of Ce_6 while GO is well dispersed in both solvents. The amount of FLG, GO and Ce_6 were determined using the absorption coefficient α obtained from calibration plots by optical absorbance (see **S5**).



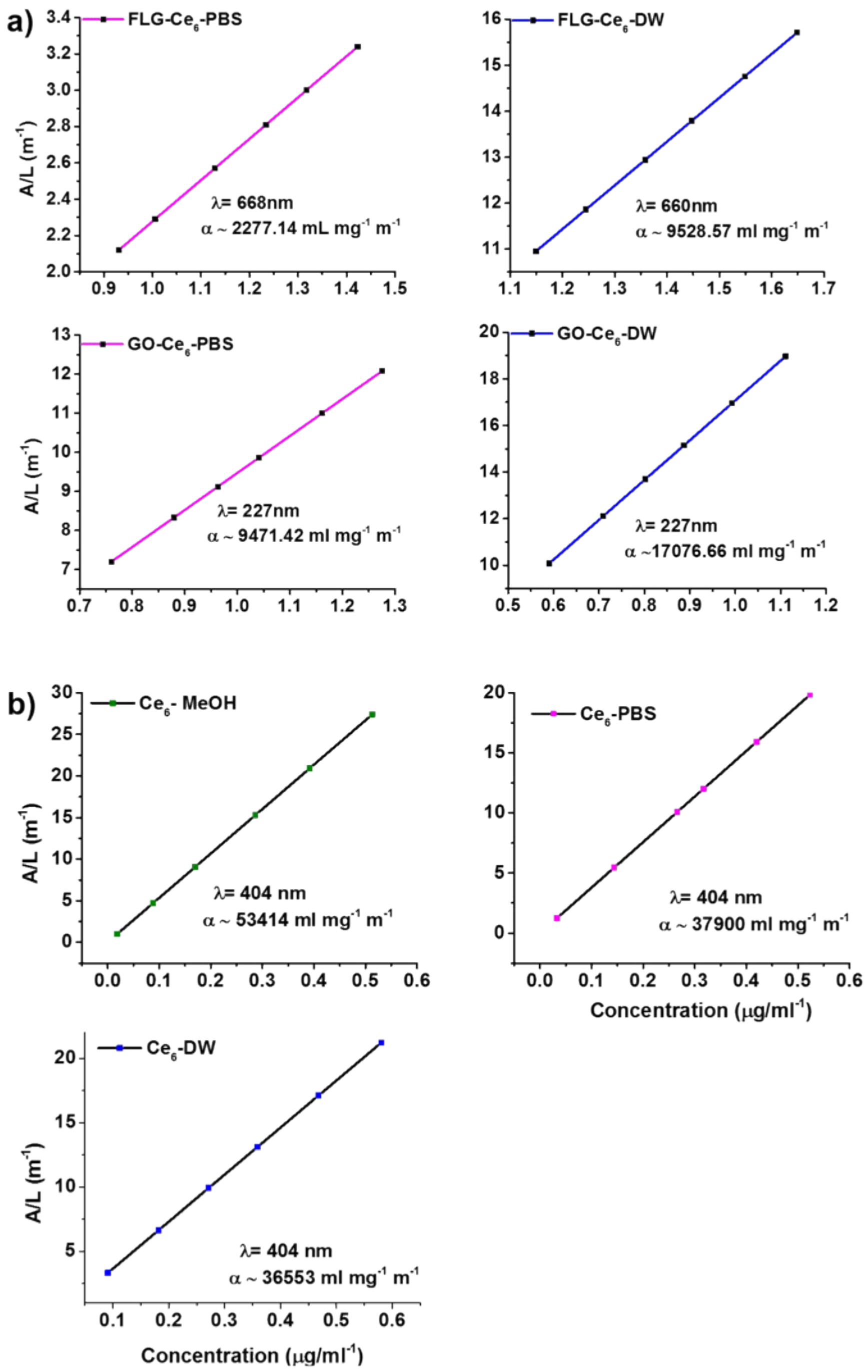
S2. Chemical structure of Ce_6.



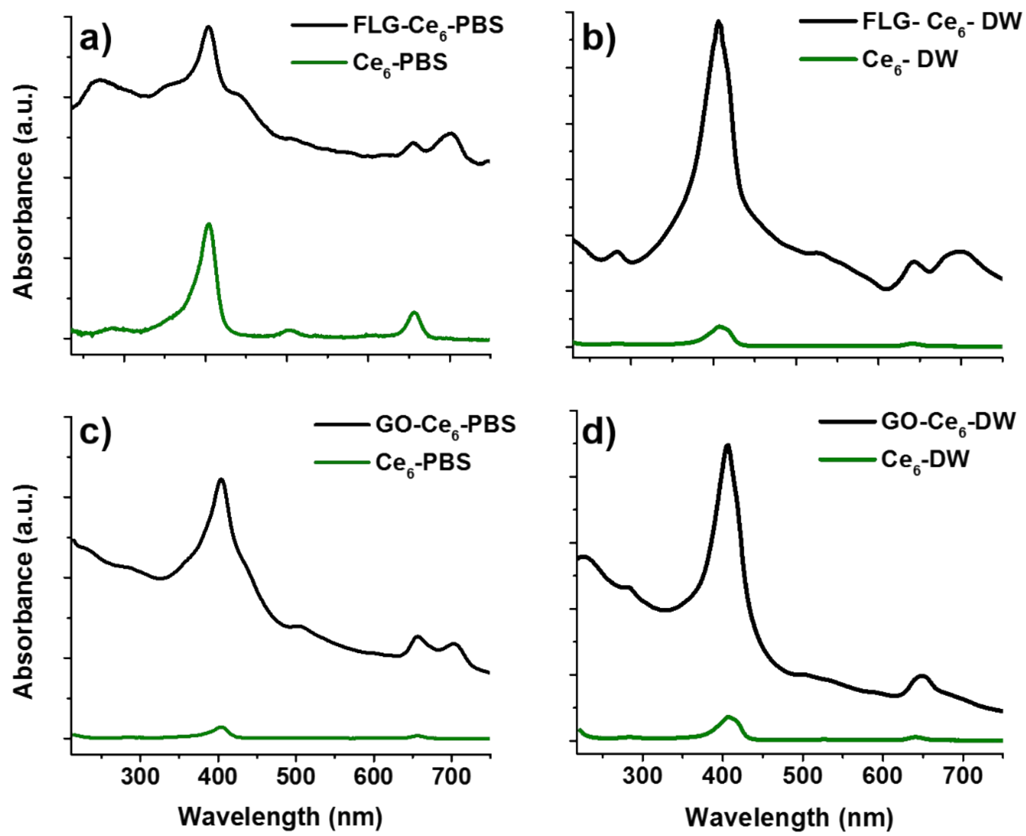
S3. Absorption spectra of Ce_6 in the solvents used during the study.



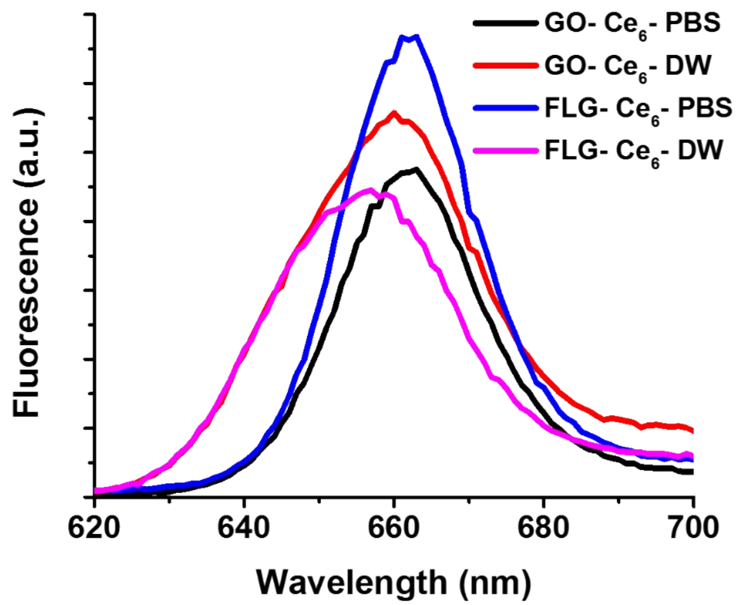
S4. Uv- vis absorption and emission spectra of **FLG-Ce$_6$** nanohybrids in PBS and DW taken every 15 minutes during the 195 minutes sonication process.



S5 a) Calibration plots by optical absorbance divided by cell length (A/L) as a function of concentration for FLG and GO dispersed in PBS and DW. The amount of graphene dispersed was determined using the absorption coefficient α, at a wavelength where Ce_6 molecules do not show any absorption, so the absorbance measured is related exclusively to the concentration of graphene in the dispersions. b). Calibration plots of Free Ce_6 dissolved in methanol (MeOH), MeOH- PBS and MeOH- DW. The amount of Ce_6 in the nanohybrids was determined using the absorption coefficient α, at a 404 nm (Soret band) of the Ce_6 molecules, so the absorbance measured is related exclusively to the concentration of Ce_6 in the nanohybrids.



S6. Uv- visible absorbance spectra of the final dispersions of each nanohybrid. Not normalized data.

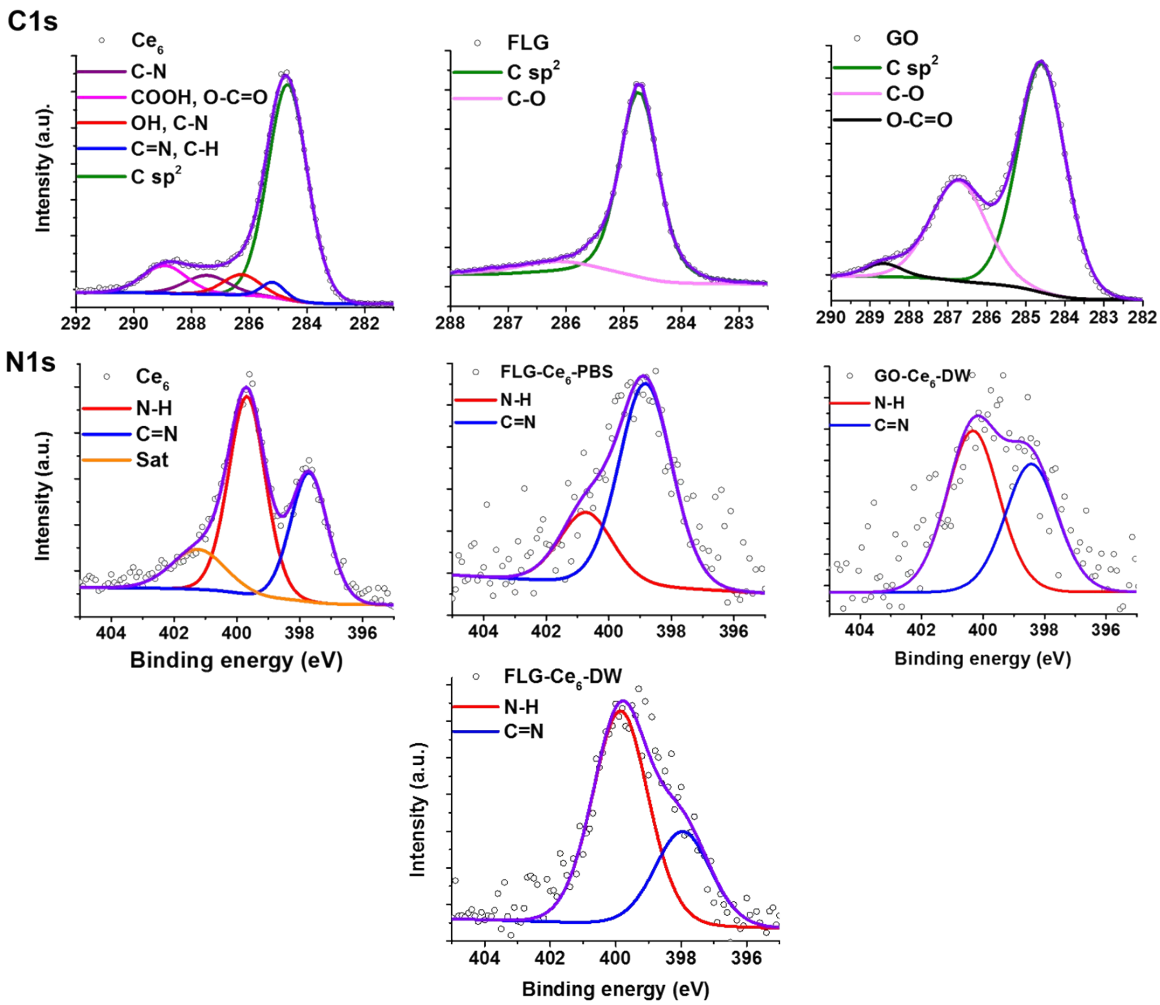


S7. Comparison of the fluorescence emission spectra (λ_{exc}= 404 nm) of the final nanohybrids.

Calculation ν, cm^{-1}						*Vibrational pattern
*Ce_6 (I)	Free Ce_6	FLG-Ce_6-PBS	FLG-Ce_6-DW	GO-Ce_6-PBS	GO-Ce_6-DW	
677	683	------	------	------	------	C_aC_b(II), C_bC_1(II), f_{as}(III)
783	745	------	------	------	------	$C_aC_mC_a$(α, β, δ), ρ(C_aC_m, γ)
898 908	872	------	880	------	------	ρ($C_{2v}H$) $C_{1e}C_{2e}$(II), C_aC_b(II), $C_aC_mC_a$(α)
978 989 996	986	983	980	979	979	$C_{1v}C_{2v}H$, $C_{2v}C_{1v}H$, C_bC_b(I) $C_{1v}C_{2v}H$, $C_{2v}C_{1v}H$, C_bC_b(I) C_1C_2(IV), C_3C_2H(IV), HC_1C_2(IV)
1114 1123 1125 1127	1119	1114	1119	1120	1120	C_aN(I, II, III), C_bC_M(II, III), C_aNC_a(I, II, III) C_aN(I, II, III), C_bC_M(I), C_aNC_a(I, III), C_aN(I, III, IV), C_bC_M(I, IV), C_mC_aN(I, III) C_aNC_a(I, III) C_aN(III, II, I), C_bC_{1e}(II)
1155 1158 1162	1160	1161	1163	1162	1162	C_aN(I, II), C_aC_m(α), C_aC_b(I, II), C_aNC_a(I, II, III) C_aN(IV), CaCm(γ), CbCbH(IV), $C_bC_1C_2$(IV) C_bC_b(IV), C_bC_bH(IV), C_aC_b(II)
1226 1228	1237	1232	1235	1233	1233	C_aC_b(II–IV), C_aN(I), C_aC_mH(α), C_aNH(I), C_aC_b(I, II, IV), C_aC_m(α, δ), C_bC_{1v}(I), C_aNH(I), C_aC_mH(α, δ)
1304	1309	1309	1303	------	------	C_aN(III, IV), C_bC_bH(IV), C_mC_aN(γ)
1357	1352	1352	1353	1350	1350	C_aC_b(III, II), C_aN(III, II), C_mC_aN(II, III)
1439 1442 1452	1454	------	1445	------	------	HC_MH(I), C_aC_b(I), C_aN(I), $C_aC_bC_b$(I), $C_mC_aC_b$(I) HC_MH(III, II), C_aN(III), C_bC_M(III), C_aC_b(III) HC_MH(IV), C_aC_m(β, γ, α)
1484	1478	1483	1472	------	------	C_aC_m(α, β, γ), C_bC_b(III), C_aN(I–III), C_aNH(I, III)
1563	1544	1541	1543	------	------	C_aC_m(α, β), C_aC_mH(α, β), C_aNH(I)
1579		1579	1579	1593	1593	C_bC_b(II), C_aC_m(β), C_bC_M(II)
1609	1603	1612	1608	1603	1605	C_aC_m(β, α), C_bC_b(II), C_aC_mH(β, α)

(*) Taken from ref. 24

S8. Raman spectral assignments of free Ce_6 and the nanohybrids.


C1s
Ce6
C-N
COOH, O-C=O
OH, C-N
C=N, C-H
C sp2
Intensity (a.u.)
FLG
C sp2
C-O
GO
C sp2
C-O
O-C=O
N1s
Ce6
N-H
C=N
Sat
Intensity (a.u.)
Binding energy (eV)
FLG-Ce6-PBS
N-H
C=N
GO-Ce6-DW
N-H
C=N
Binding energy (eV)
FLG-Ce6-DW
N-H
C=N
Intensity (a.u.)
Binding energy (eV)

S9. C1s core levels recorded for Ce_6 powder, FLG (DMF) and GO were measured as controls. The N1s core level of the Ce_6 powder is composed by two peaks related to N-H and C=N bonds and a small shake-up satellite. The main peaks in principle should be equivalent, the slightly lower amount of C=N component can be due to a possible tiny oxidation of the molecules since the powder was not outgassed in UHV prior to the XPS measurements. (b,c,d) Nitrogen signal, in a range from 1.3 to 2.3 at. %, was found on FLG- Ce_6-PBS, FLG- Ce_6-DW and GO-Ce_6-PBS nanohybrids confirming the presence of the molecules; the amount of N1s in GO-Ce_6-PBS was less than 1% (data not shown). In average a higher signal was recorded on the samples in DW, confirming the Raman results. The lineshape of the nitrogen core level on the hybrids preserves the double peak feature, even though with a larger FWHM (from 1.3 eV in the Ce_6 powder to 2.0 eV).