Electronic Supplementary Material (ESI) for New Journal of Chemistry.

Urea-assisted Cooperative Assembly of Phosphorus Dendrimer-Zinc Oxide Hybrid Nanostructures

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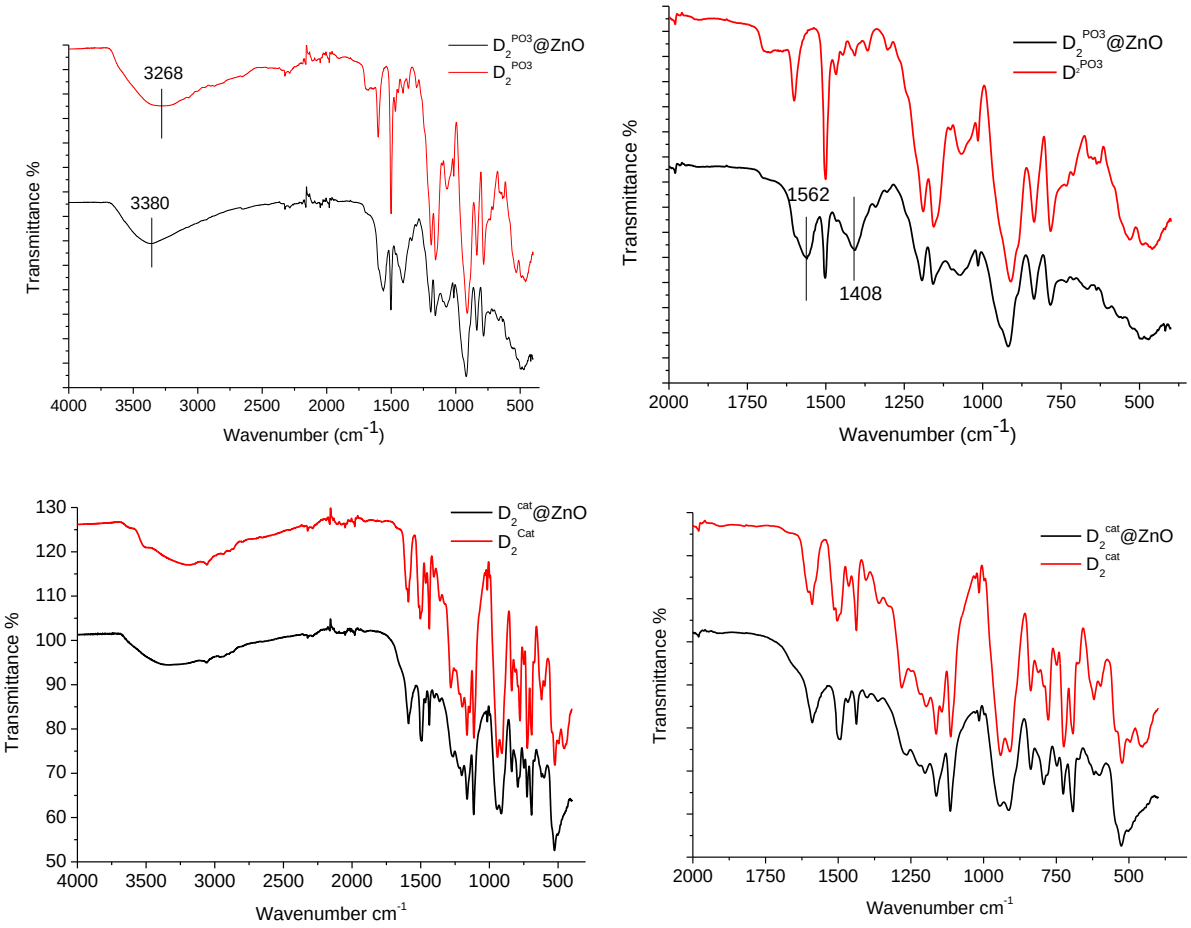
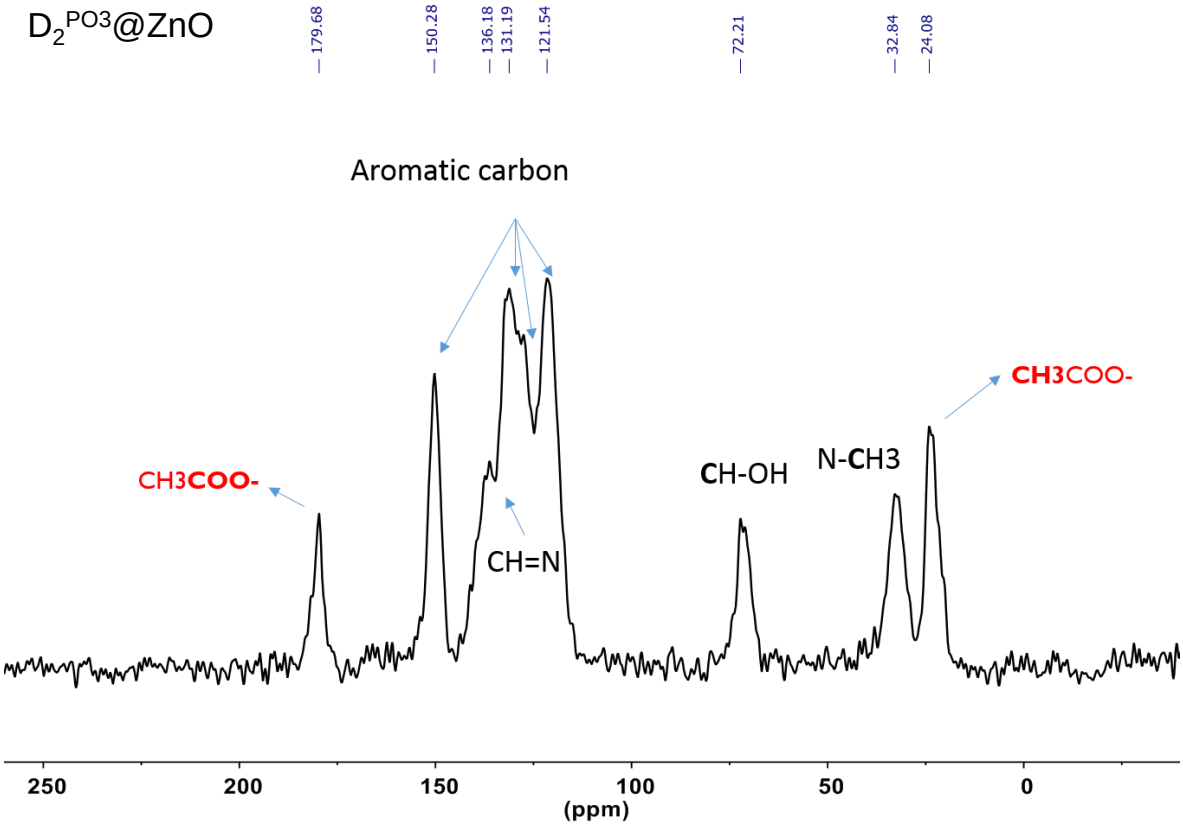
Table S1

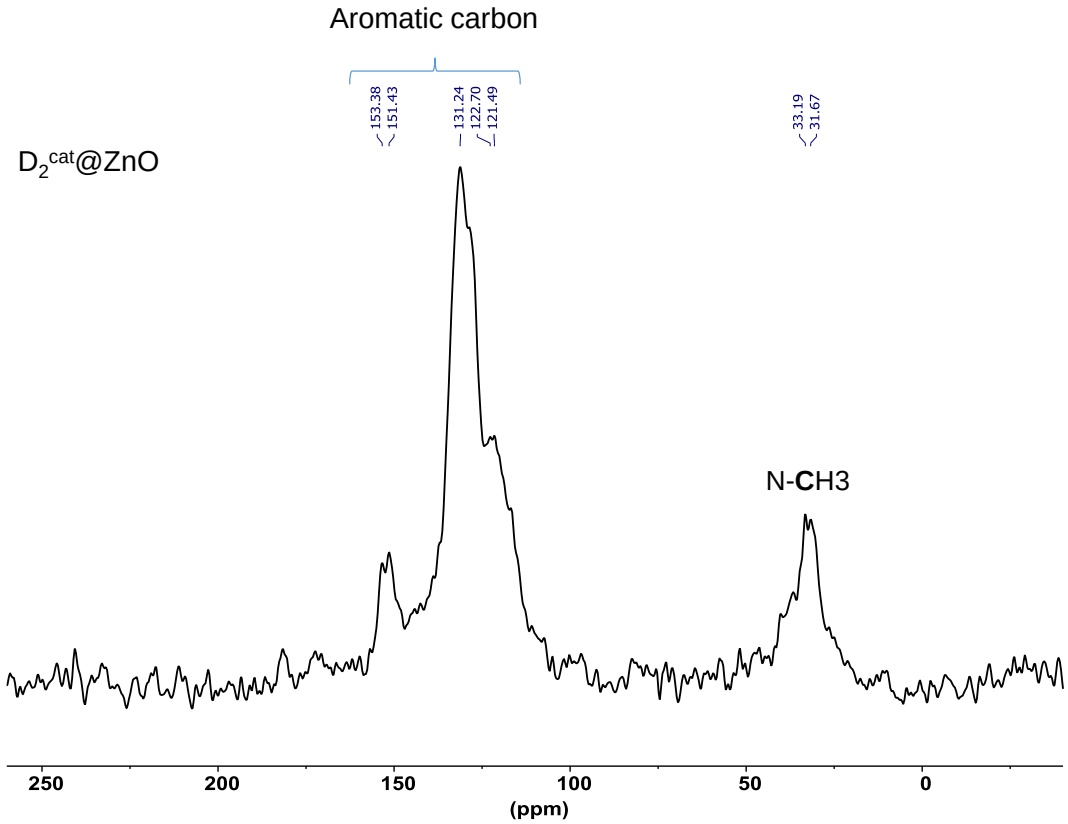
Samples	DG_2	Zinc precursors	Solvent	Comment	Weight
DG_2^{PO3}@ZnO	DG_2^{PO3} (30 mg)	Zinc acetate (1.29 g)	H_2O/EtOH (8ml/10mL)	The transparent solution turned immediately cloudy after adding zinc forming white solid. The mixture was heated at 60°C for 48 hours.	47 mg
D_2G^{PO3}@ZnO	DG_2^{PO3} (30 mg)	Zinc acetate (1.29 g)	H_2O (10mL)	The transparent solution turned immediately cloudy after adding zinc forming white solid. The mixture was heated at 60°C for 48 hours	23 mg
DG_2^{cat}@ZnO	DG_2^{cat} (30 mg)	Zinc acetate (0.29 g)	H_2O/THF (4ml/13mL)	The solid is obtained after reflux (48 hours)	30 mg
-	DG_2^{NEt2} (30 mg)	Zinc acetate (0.70 g)	H_2O (8mL)	The solution remains transparent after reflux (48 hours)	0 mg
-	DG_2^{acac} (30 mg)	Zinc acetate (0.60 g)	H_2O/THF (4ml/10mL)	The solution remains transparent after reflux (48 hours)	0 mg

S1. DRIFT spectra of DG_2@ZnO



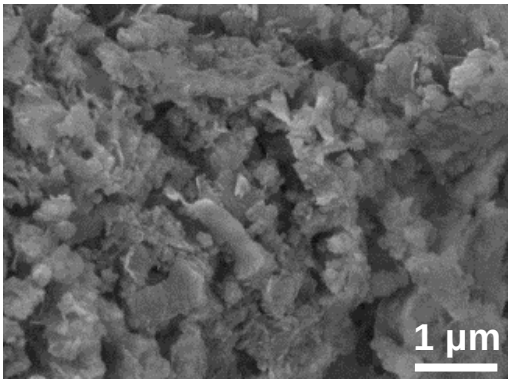
S2. ^{13}C CP MAS NMR of DG_2@ZnO

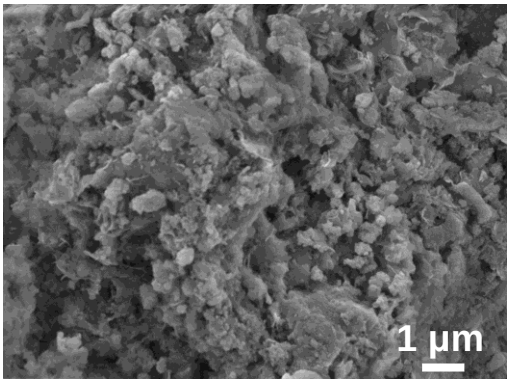




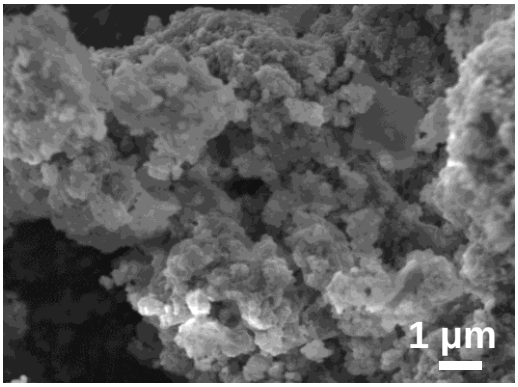
S3. SEM analysis of DG_2@ZnO

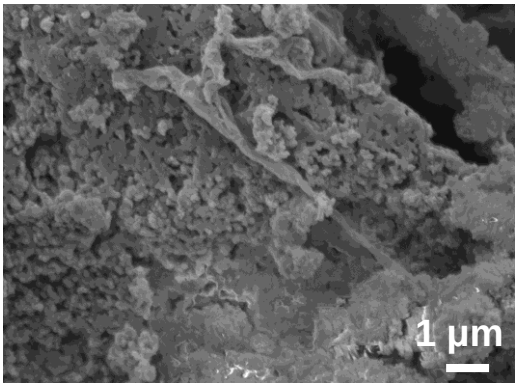
SEM analysis of DG_2^{PO3}@ZnO:





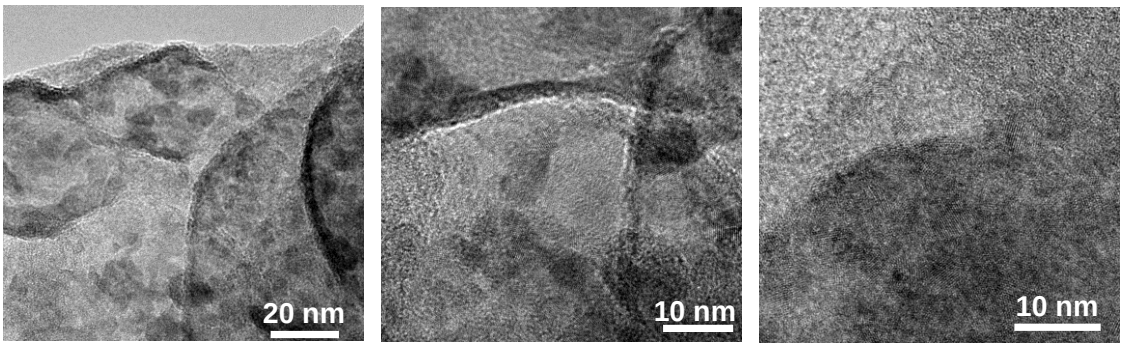
SEM analysis of DG_2^{cat}@ZnO:



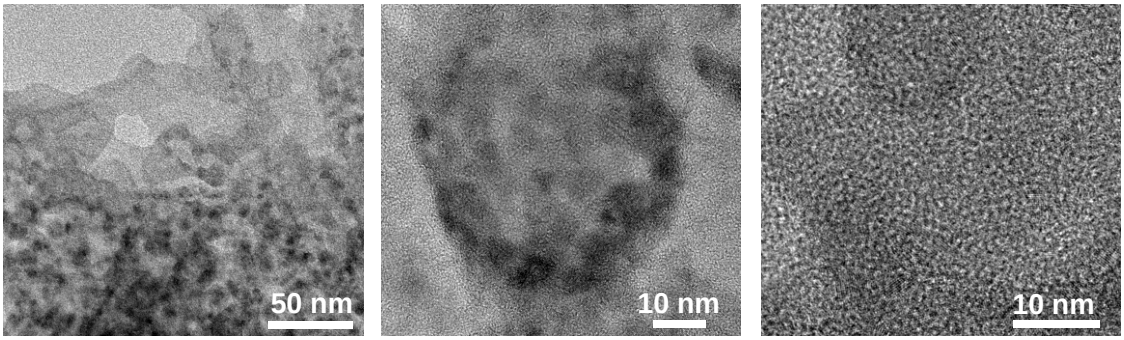


S4. HRTEM analysis of DG_2@ZnO

HRTEM analysis of DG_2^{PO3}@ZnO

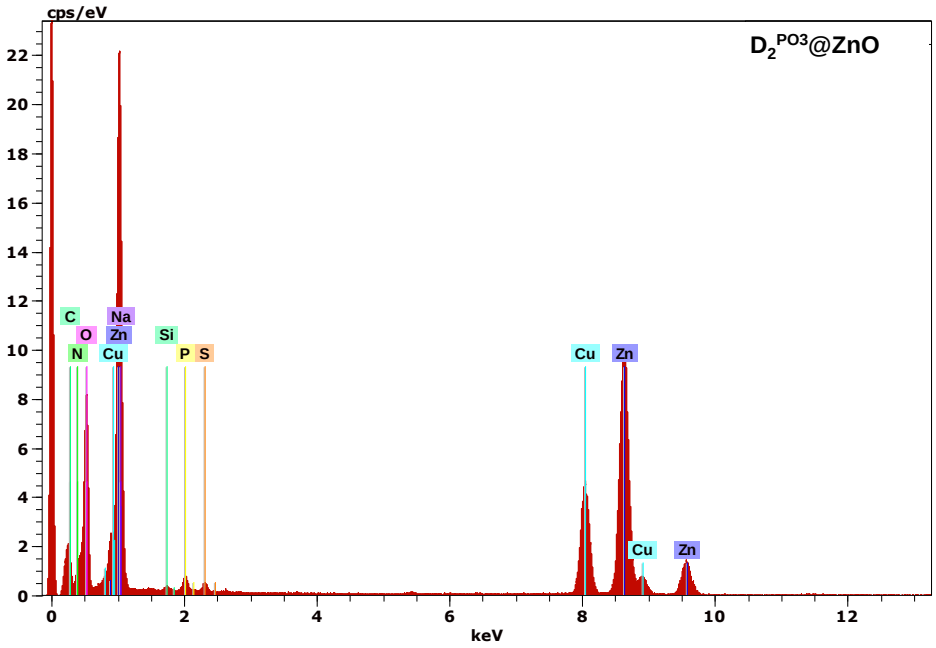


HRTEM analysis of DG_2^{cat}@ZnO



S5. EDX analysis of DG_2@ZnO

EDX analysis of DG_2^{PO3}@ZnO



EDX analysis of DG_2^{cat}@ZnO

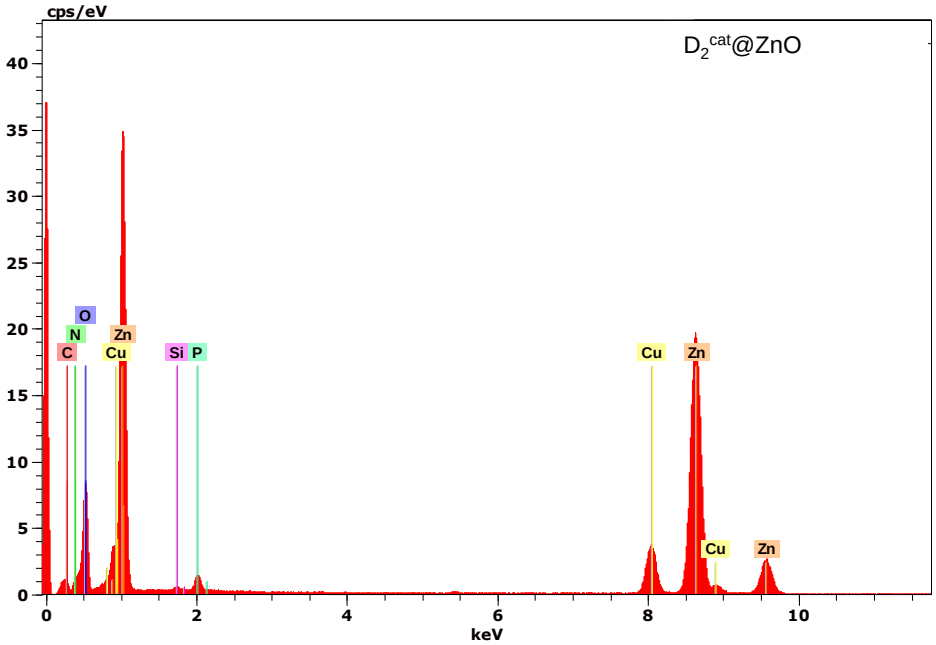
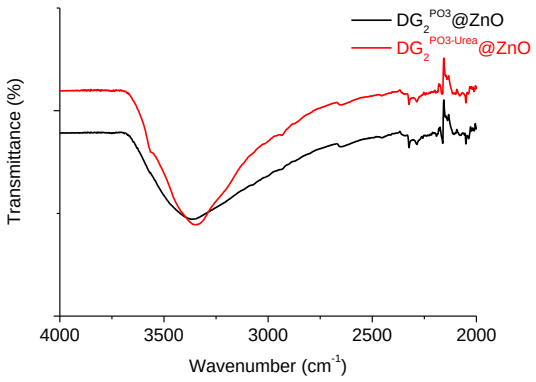
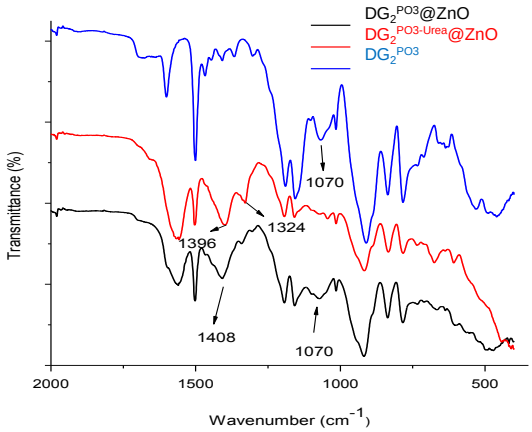


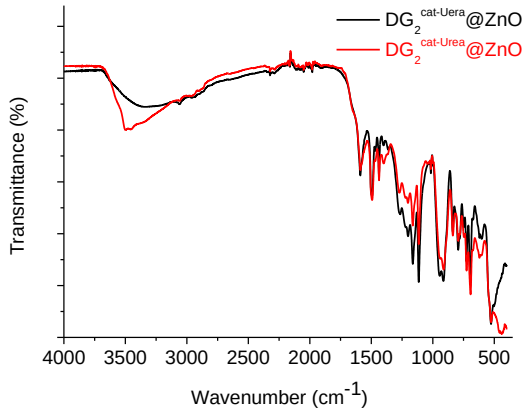
Table S2. Various information related to the experiment protocols and also the yield of each samples obtained in presence of urea.

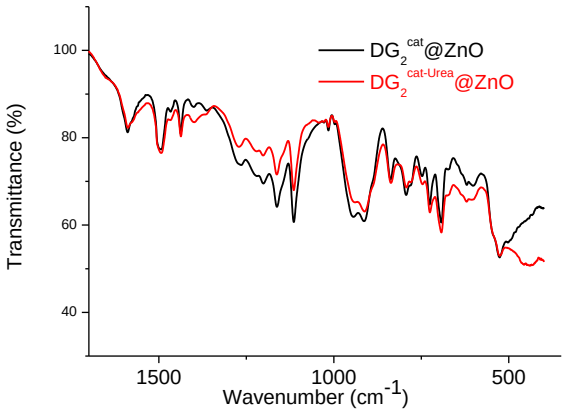
Samples	DG2	Zinc precursors	Solvent	Comment	Weight
$DG_2^{PO3\text{-}Urea}$@ZnO	**DG_2^{PO3}** (30 mg)	Zinc acetate (1.29 g)	H_2O/EtOH (8ml/10mL)	The transparent solution turned immediately cloudy after adding zinc forming white solid. The mixture was heated at 60°C for 48 hours	83 mg
DG_2^{cat}-Urea@ZnO	**DG_2^{cat}** (15 mg)	$ZnCl_2$ (0.10 g)	H_2O/THF (1ml/4mL)	The solid is formed after reflux (48 hours)	62 mg
$DG_2^{NEt2\text{-}Urea}$@ZnO	**DG_2^{NEt2}** (30 mg)	Zinc acetate (0.70 mg)	H_2O (4mL)	The solid is formed after reflux (48 hours)	29 mg
$DG_2^{acac\text{-}Urea}$@ZnO	**DG_2^{acac}** (30 mg)	$ZnCl_2$ (0.20 mg)	H_2O/THF (8ml/2mL)	The solid is formed after reflux (48 hours)	35mg
Urea@ZnO-	-	$ZnCl_2$ (1.49 mg)	H_2O/THF (8ml/2mL)	The solid is formed after reflux (48 hours)	80mg

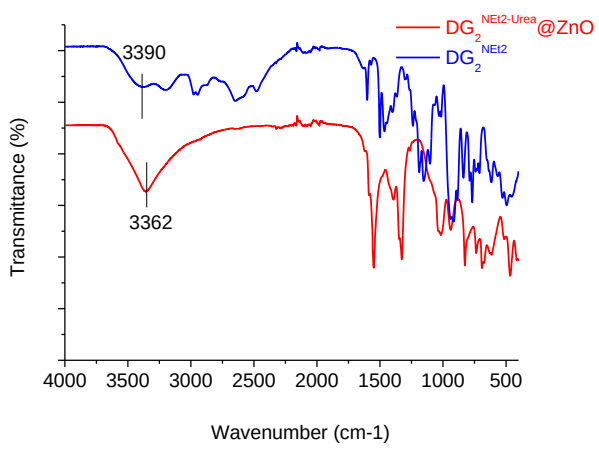
S6. DRIFT spectra of DG_2^{-Urea}@ZnO

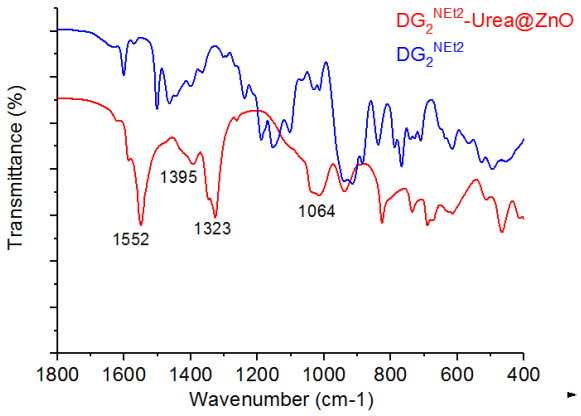






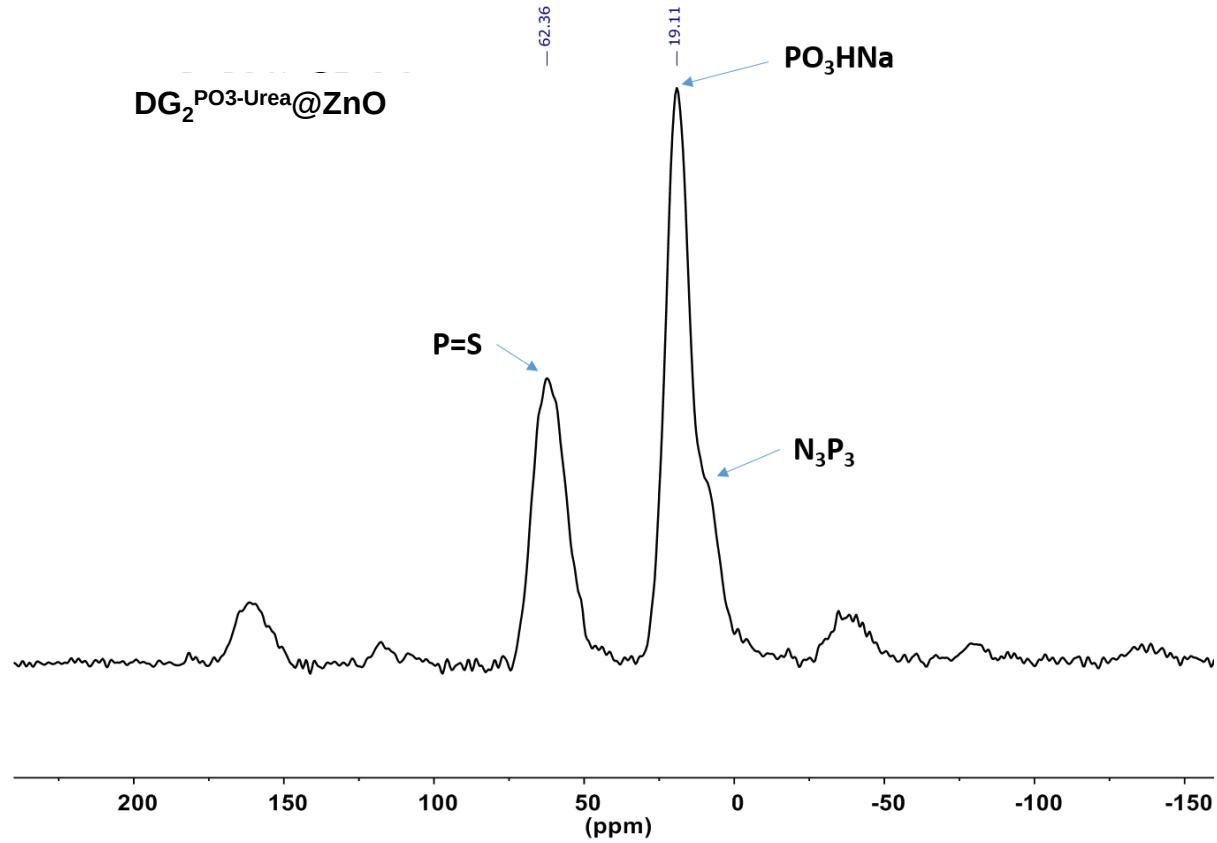


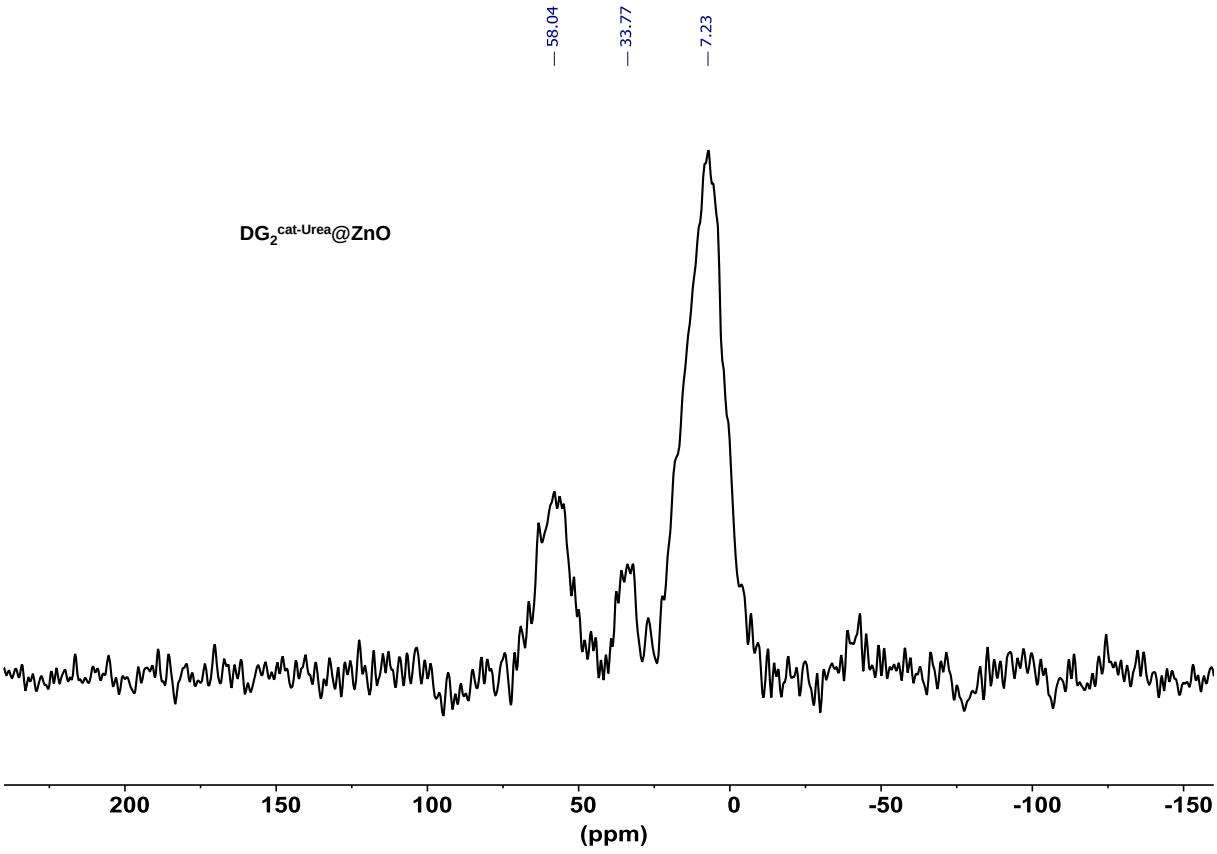


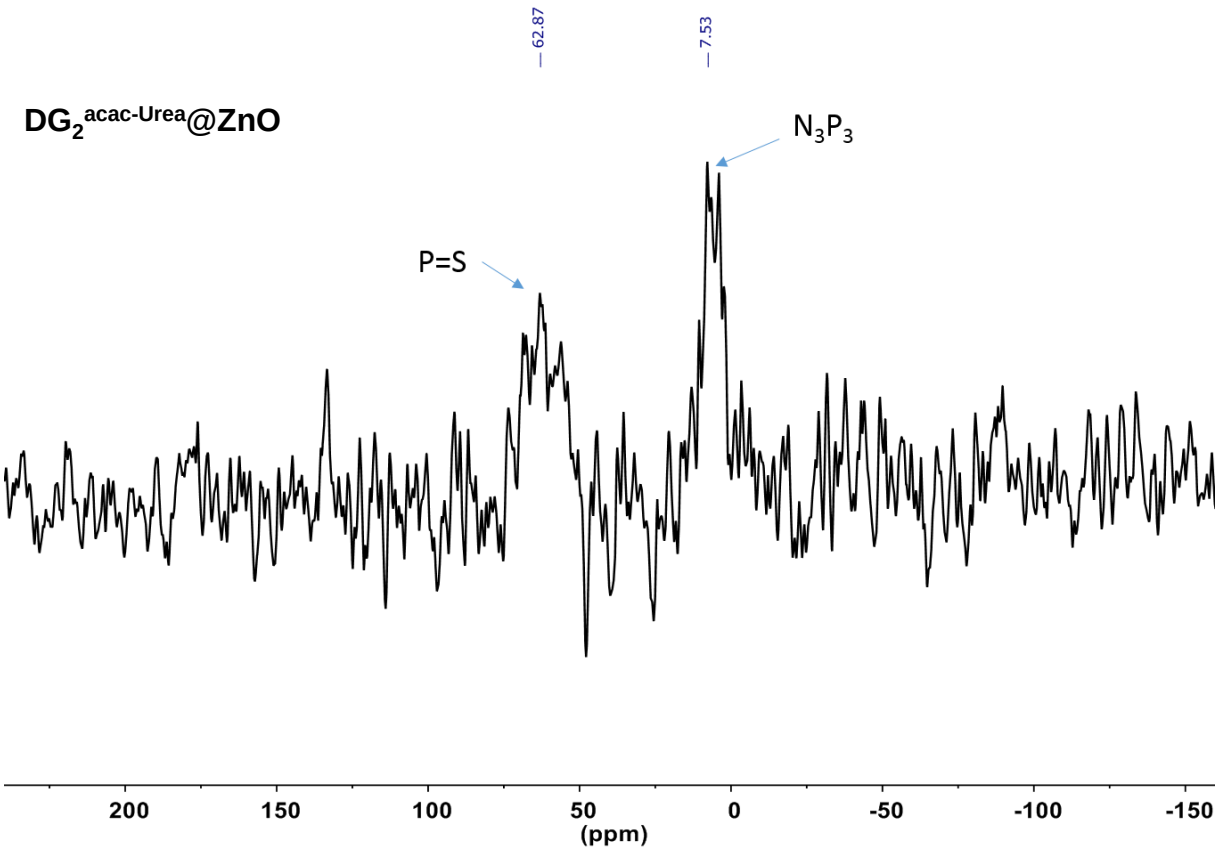


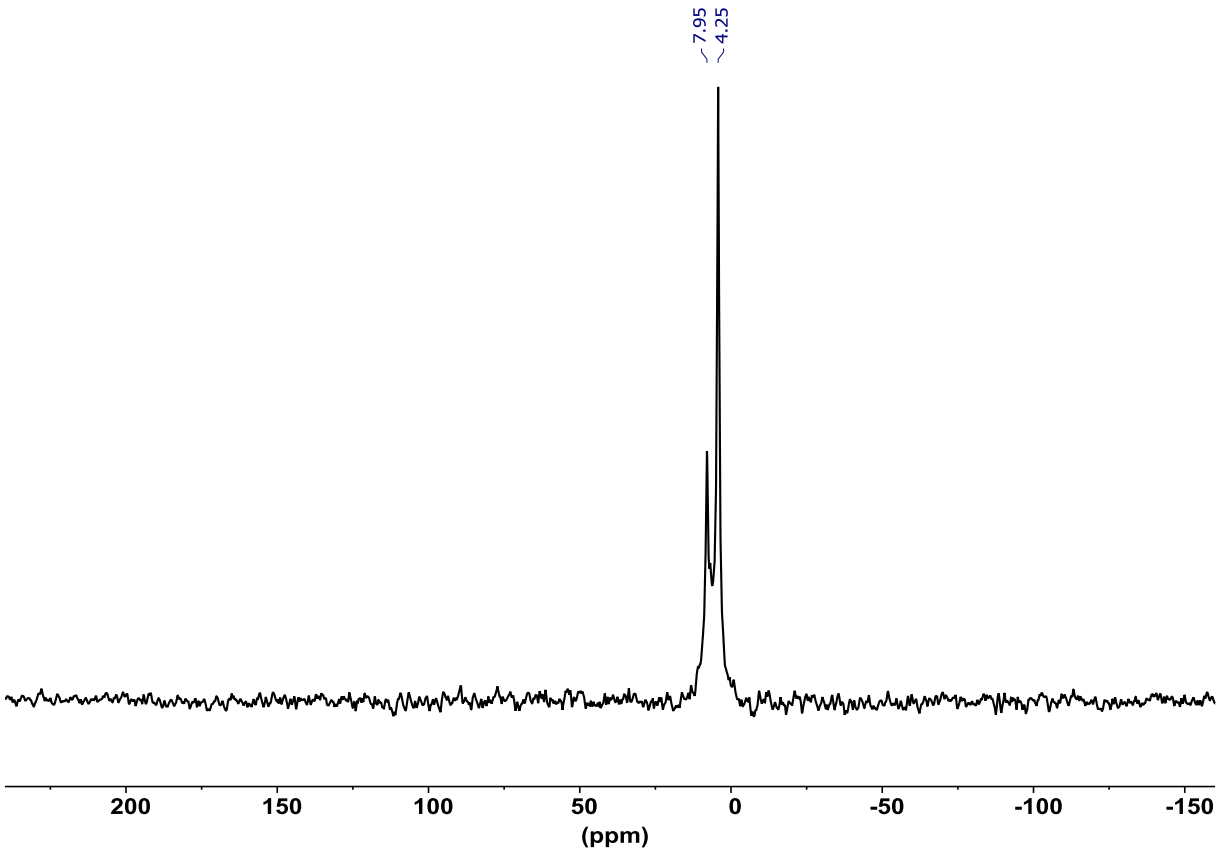
S7. ^{31}P and ^{13}C CP MAS NMR of DG_2^{-Urea}@ZnO

^{31}P CP MAS NMR of DG_2^{-Urea}@ZnO

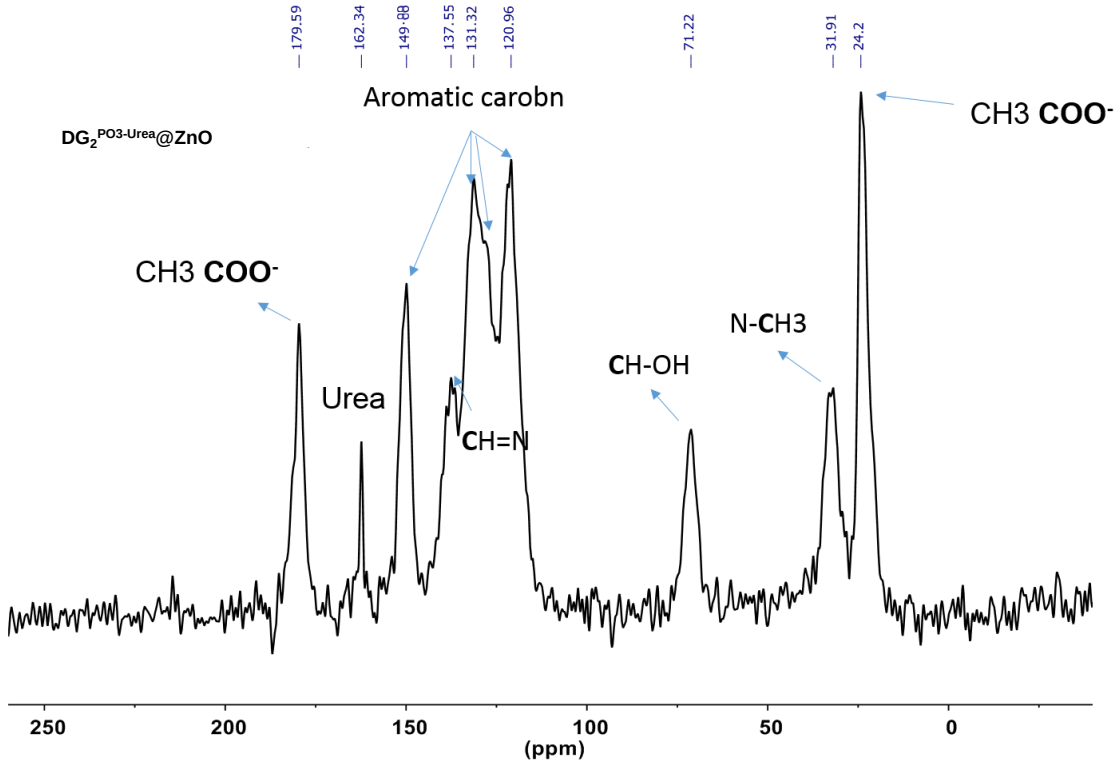


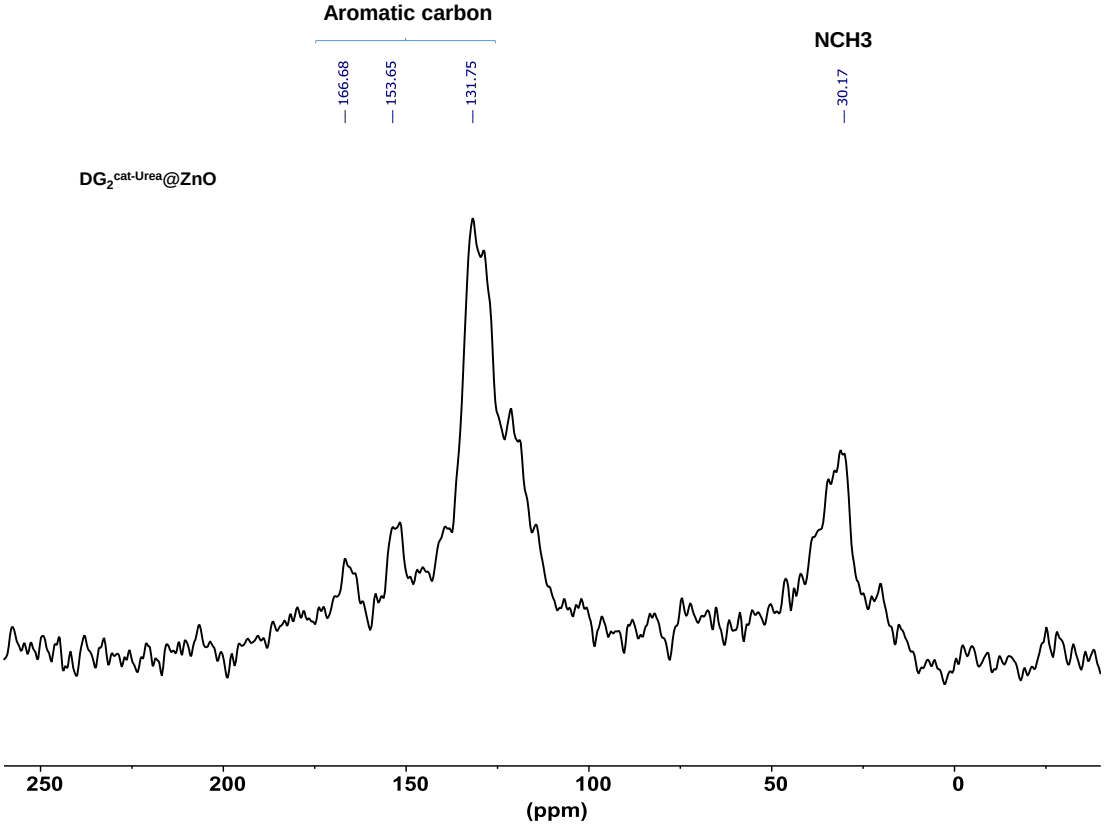


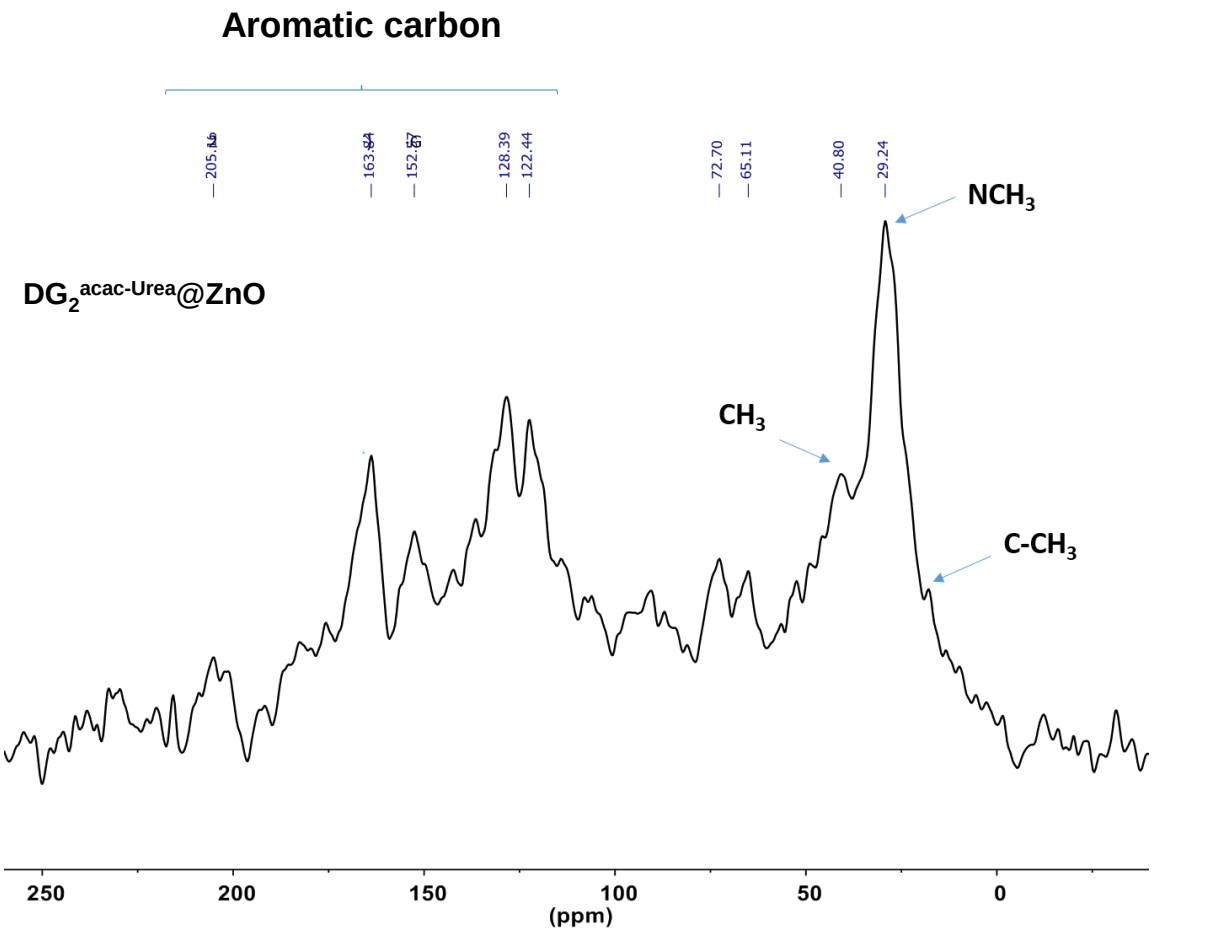


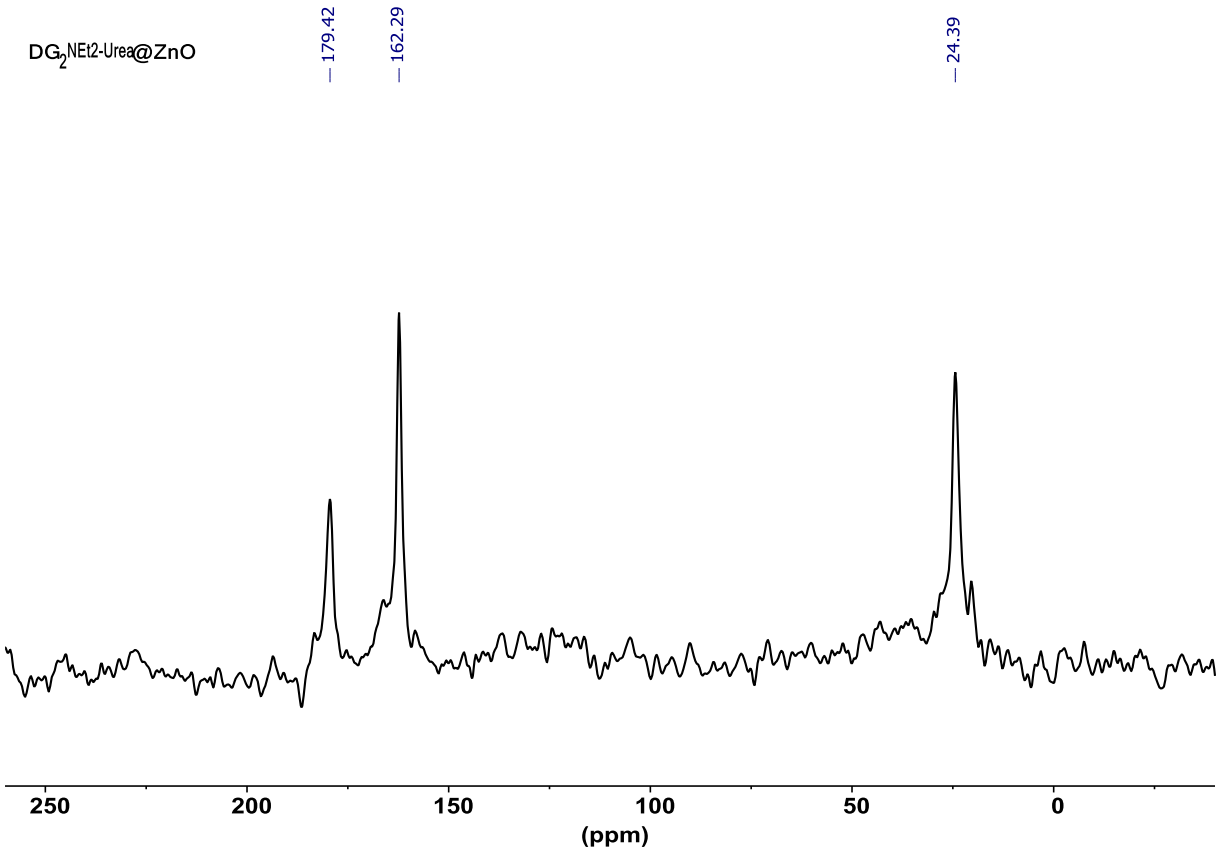


^{13}C CP MAS NMR of DG_2^{-Urea}@ZnO


179.59
162.34
149.88
137.55
131.32
120.96
71.22
31.91
24.2
Aromatic carobn
DG2PO3-Urea@ZnO
CH3 COO-
CH3 COO-
N-CH3
CH-OH
Urea
CH=N
250
200
150
100
50
0
(ppm)

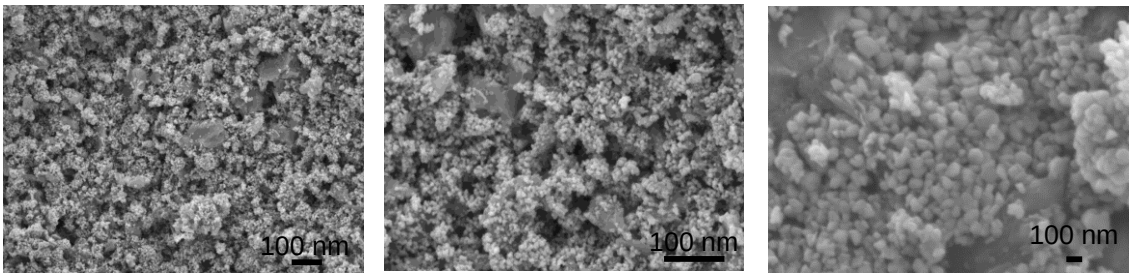

Aromatic carbon
NCH3
166.68
153.65
131.75
30.17
DG2cat-Urea@ZnO
250
200
150
100
50
0
(ppm)


Aromatic carbon
205.46
163.94
152.67
128.39
122.44
72.70
65.11
40.80
29.24
NCH3
DG2acac-Urea@ZnO
CH3
C-CH3
250
200
150
100
50
0
(ppm)

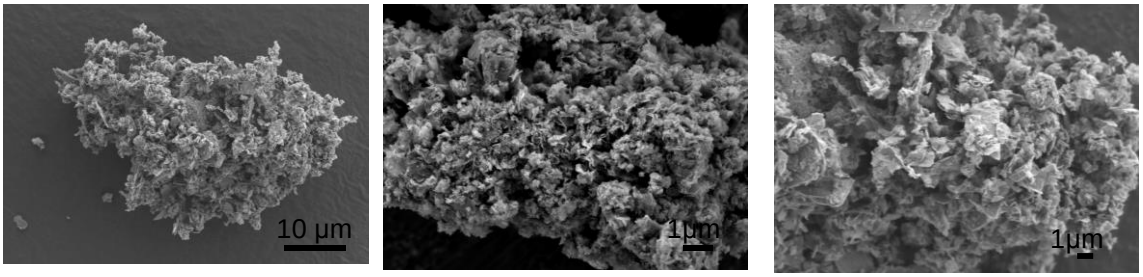

DG2NEt2-Urea@ZnO
179.42
162.29
24.39
250
200
150
100
50
0
(ppm)

S8. SEM analysis of DG_2^{-Urea} @ZnO

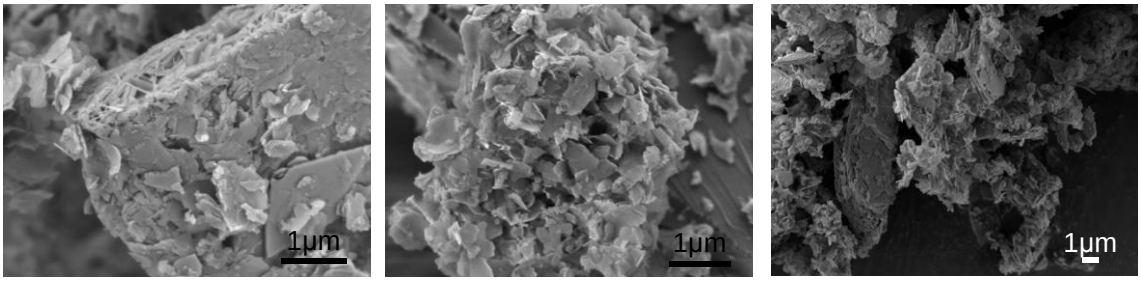
SEM analysis of $DG_2^{PO3-Urea}$ @ZnO



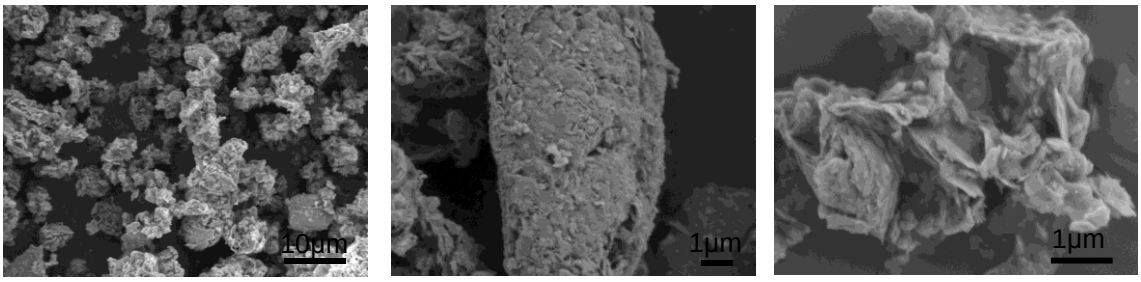
SEM analysis of $DG_2^{cat-Urea}$ @ZnO



SEM analysis of $DG_2^{acac-Urea}$ @ZnO

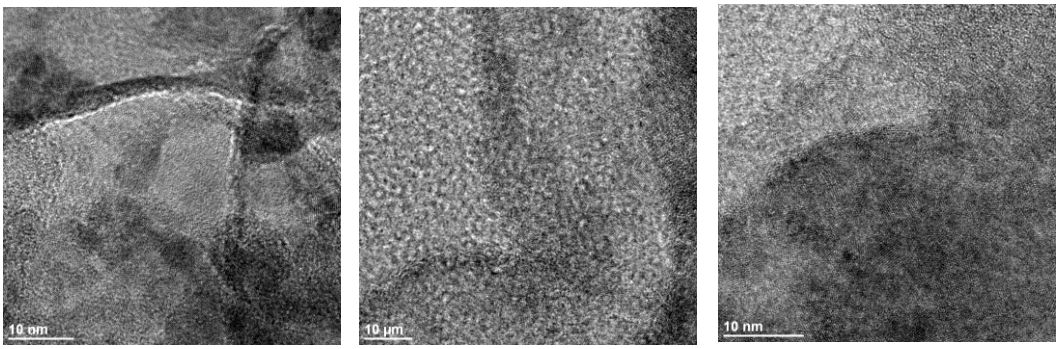


SEM analysis of $DG_2^{NEt2-Urea}$ @ZnO

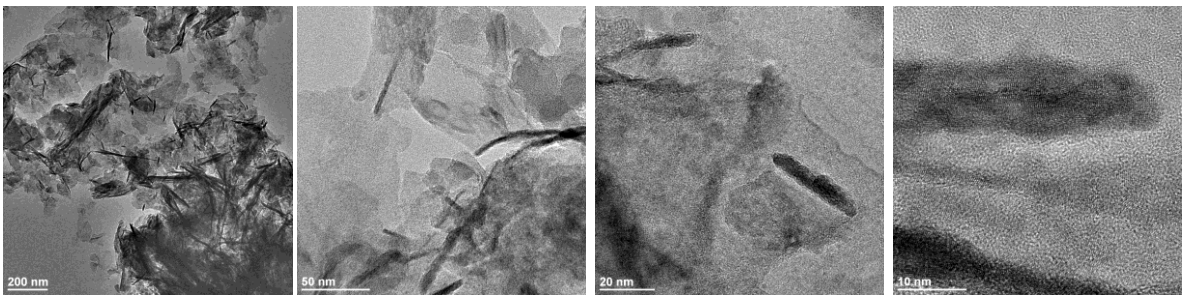


S9. HRTEM analysis of DG_2^{-Urea} @ZnO

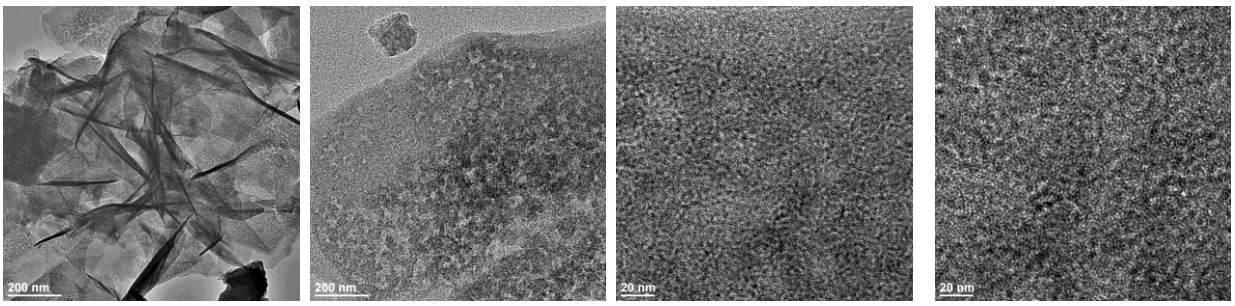
HRTEM analysis of $DG_2^{PO3-Urea}$ @ZnO



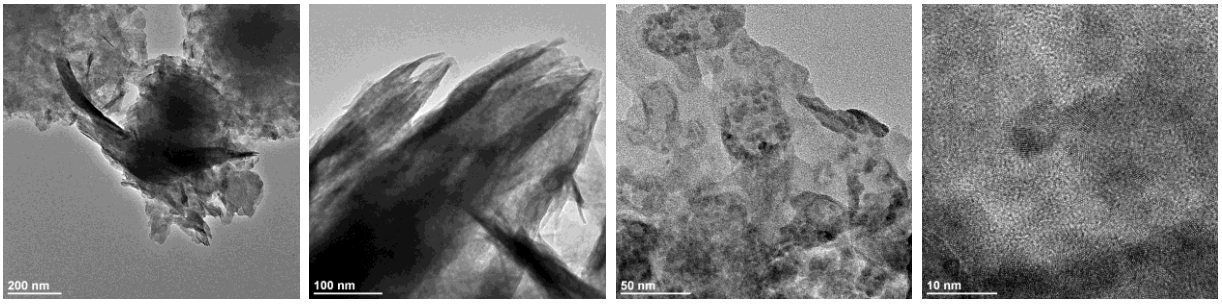
HRTEM analysis of $DG_2^{cat-Urea}$ @ZnO



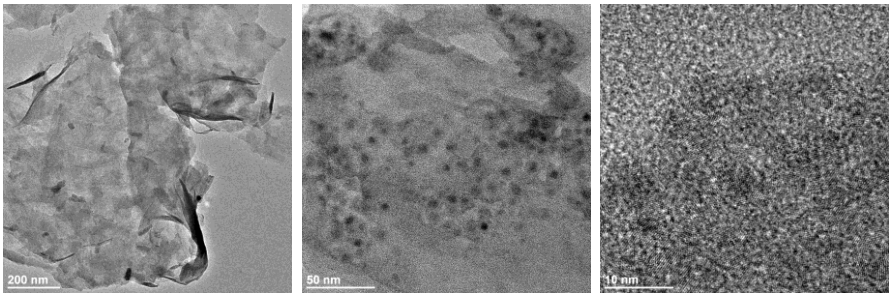
HRTEM analysis of $DG_2^{acac-Urea}$ @ZnO



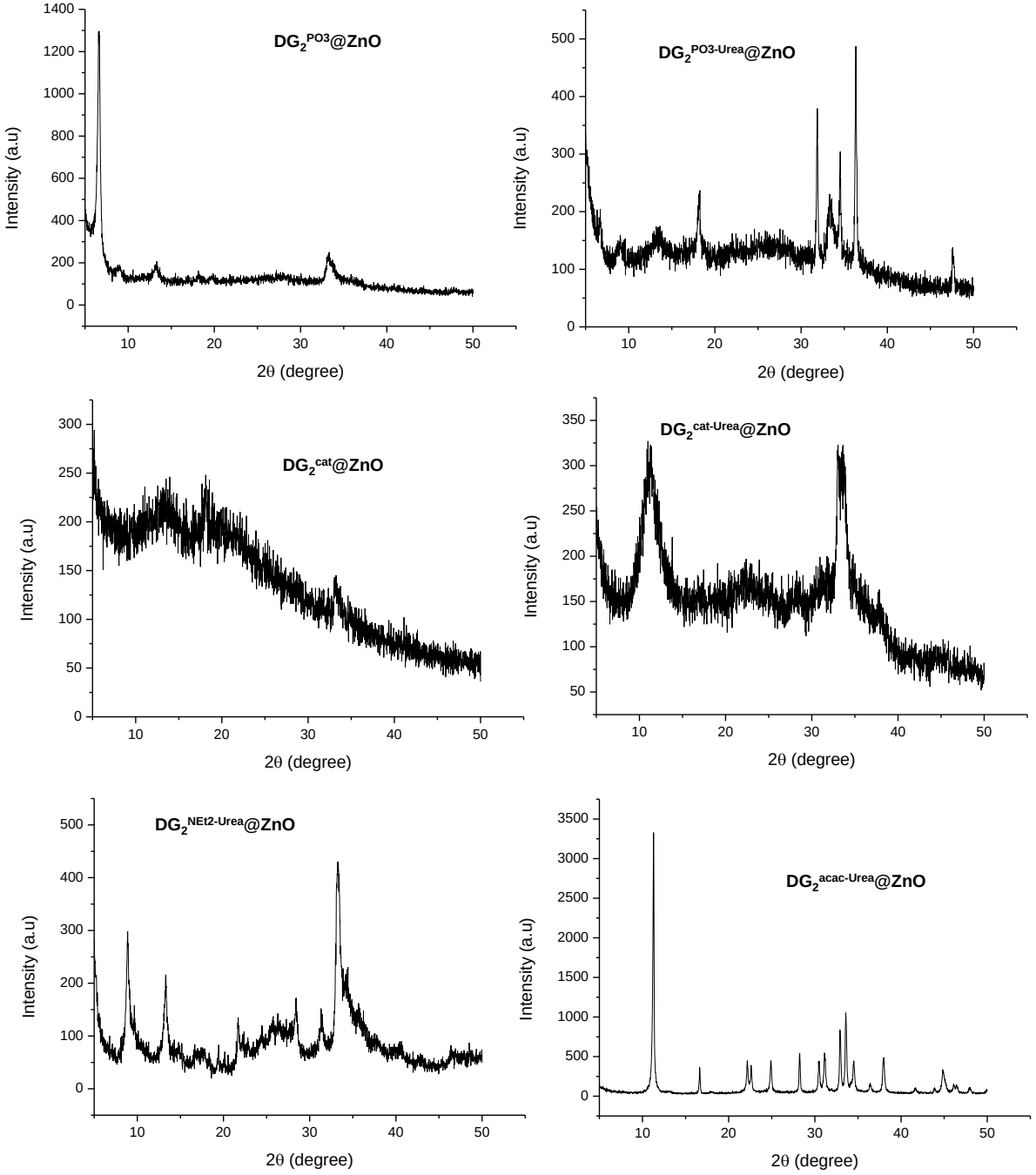
HRTEM analysis of $DG_2^{NEt2-Urea}$ @ZnO



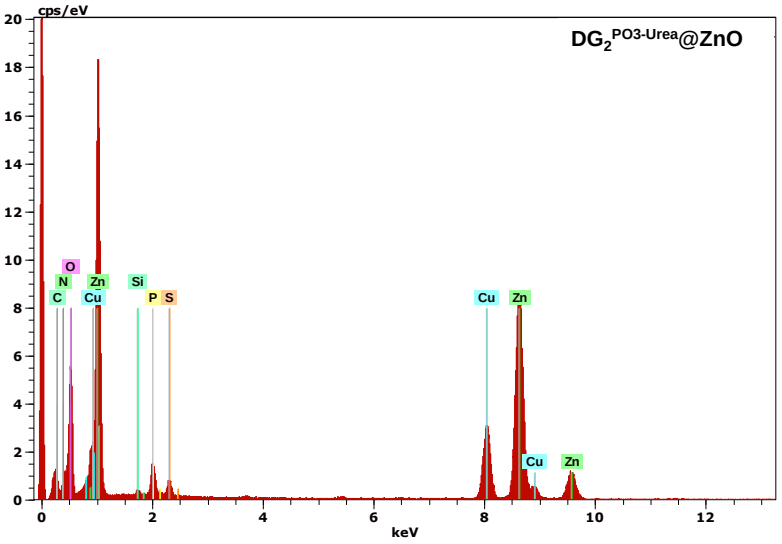
HRTEM analysis of Urea @ZnO

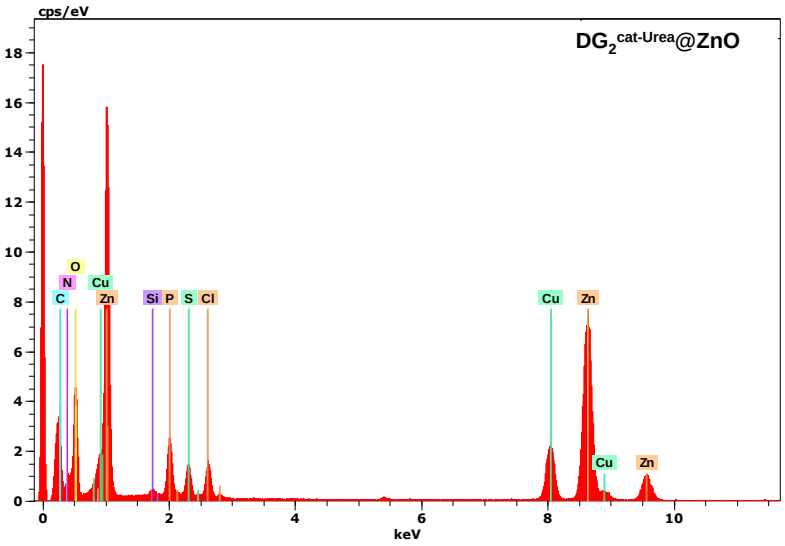


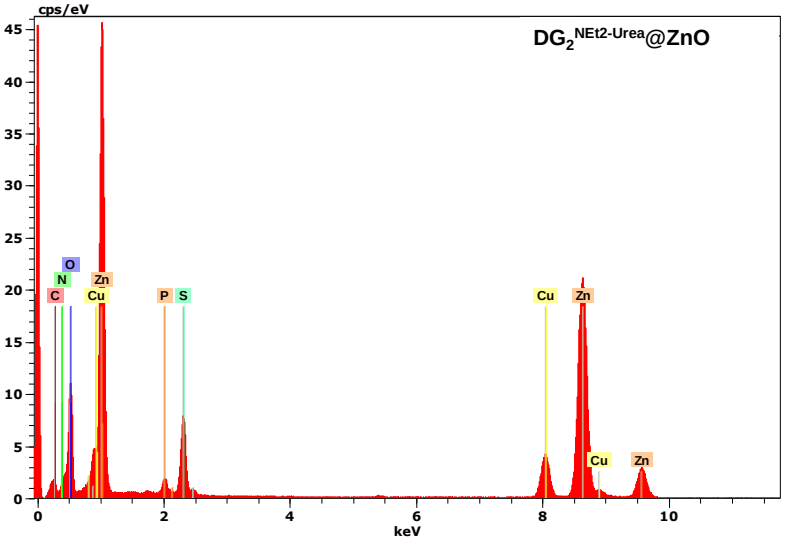
S10. XRD analysis of DG_2@ZnO and DG_2^{-Urea} @ZnO



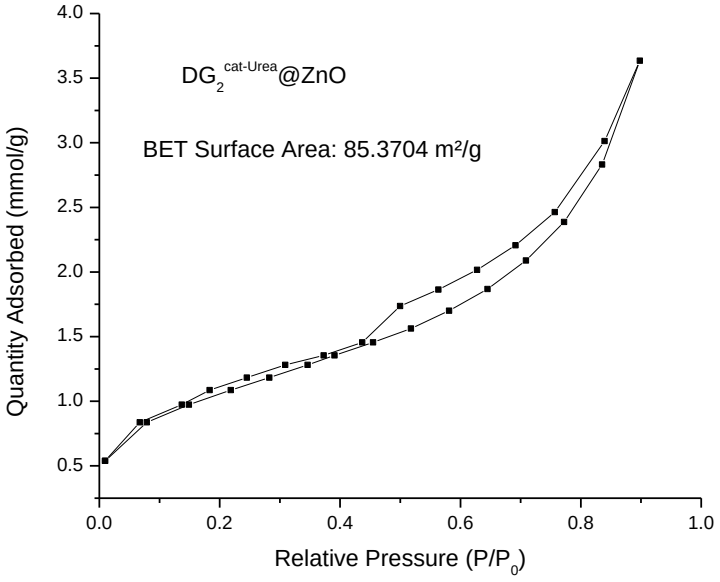
S11. EDX analysis of DG_2^{-Urea}@ZnO

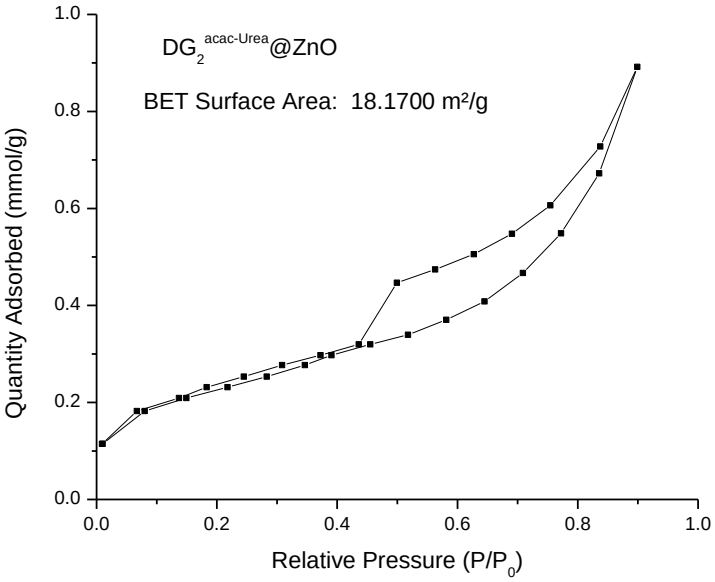


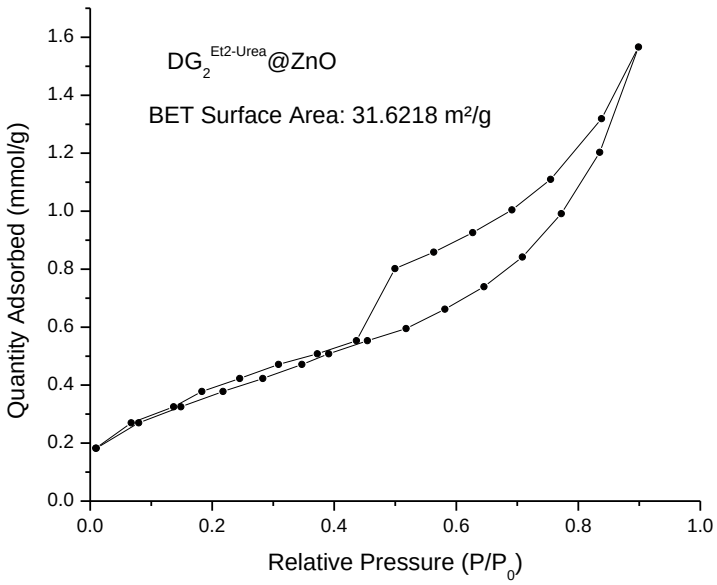


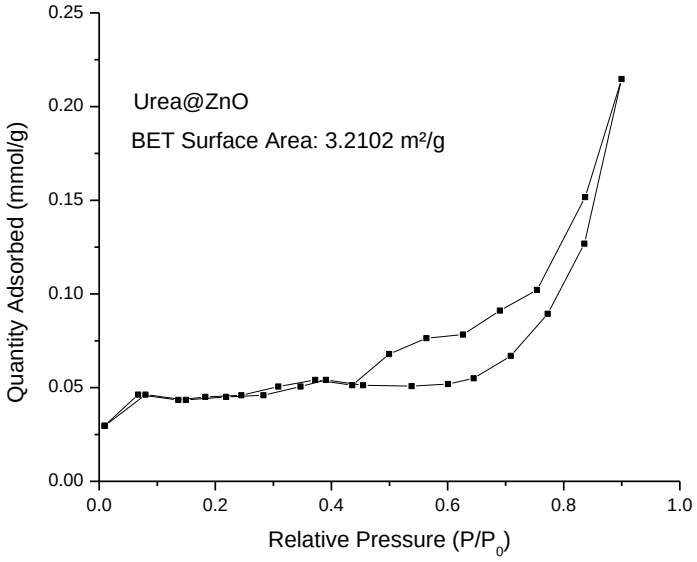


S12. Nitrogen sorption analysis of DG_2^{-Urea}@ZnO








Urea@ZnO
BET Surface Area: 3.2102 m²/g
Quantity Adsorbed (mmol/g)
Relative Pressure (P/P0)
0.25
0.20
0.15
0.10
0.05
0.00
0.0
0.2
0.4
0.6
0.8
1.0