Supporting Information File

Green Synthesis of Novel Polyoxoanions of Tungsten Containing Phosphorus as Hetero atom: Characterization, Non-isothermal Decomposition Kinetics and Photocatalytic Activity

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New Journal of Chemistry

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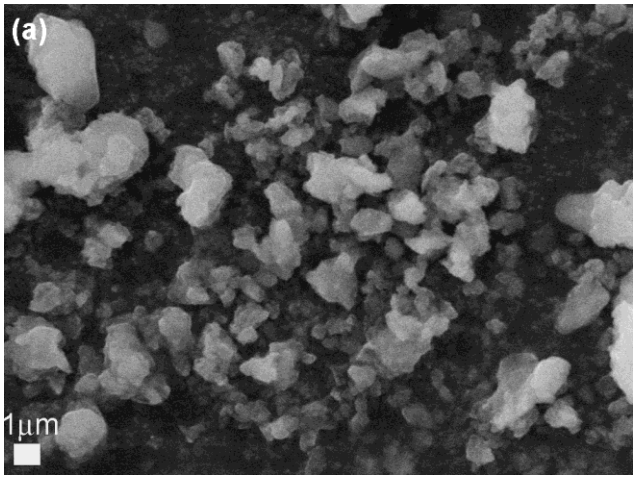
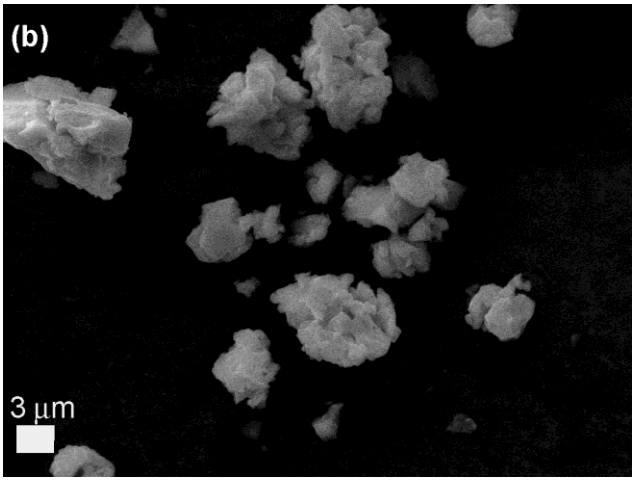
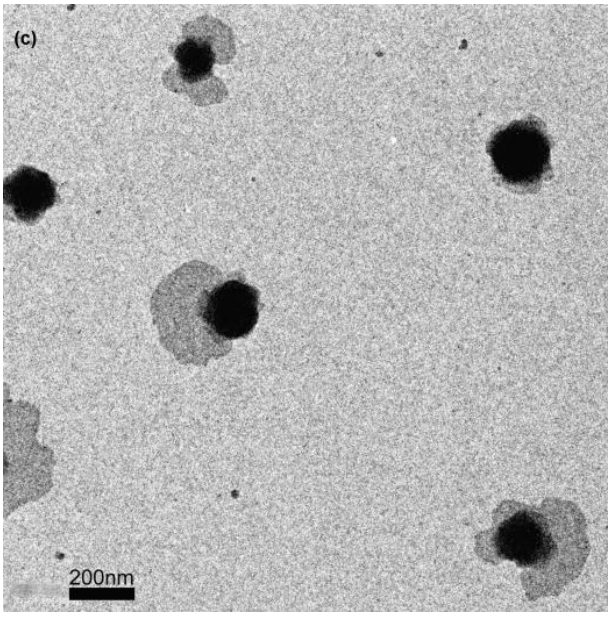
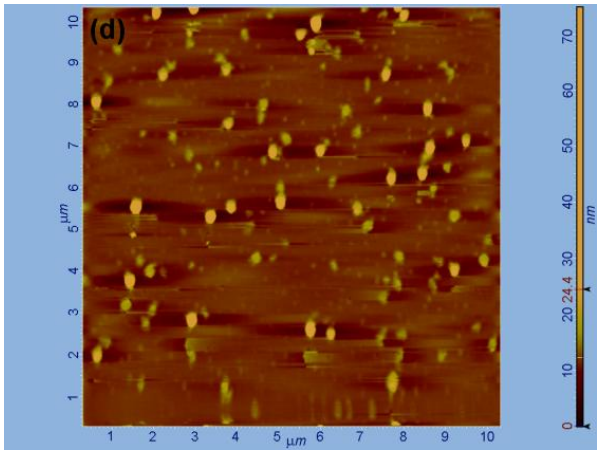
1. The Figures discussed in the manuscript

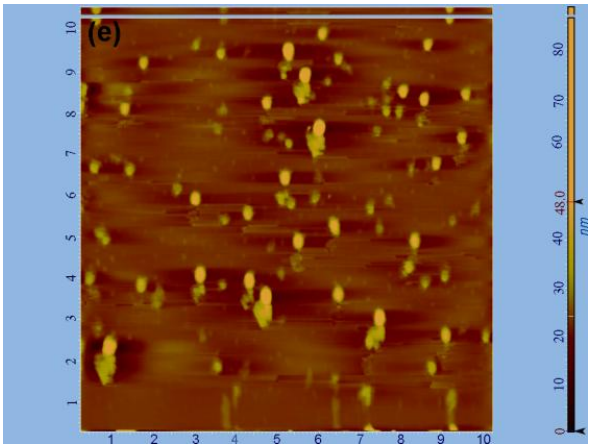
Fig. S1 (a-b) SEM (c) TEM (d-e) AFM images of CPW nanospheres.








(d)
μm
μm
nm
0
10
20
24.4
30
40
50
60
70


(e)
nm
0
10
20
30
40
48.0
60
70
80

2. The Tables discussed in the manuscript

Table S1 Kinetic parameters for stages I and II for the non–isothermal decomposition of CPW by FWO and KAS methods.

Degree of Conversion (α)	FWO		KAS	
	Stage I	Stage II	Stage I	Stage II
	E (kJ/mol)	*E* (kJ/mol)	*E* (kJ/mol)	*E* (kJ/mol)
0.1	190.14 ± 9.51	172.17±8.61	190.48±9.52	169.96±8.50
0.2	173.43 ± 8.67	175.21±8.76	172.77±8.64	173.09±8.65
0.3	164.56 ± 8.23	171.40±8.57	163.32±8.17	169.03±8.45
0.4	160.02 ± 8.0	171.56±8.58	158.46±7.92	169.15±8.46
0.5	155.46 ± 7.77	172.03±8.60	153.57±7.68	169.62±8.48
0.6	153.98 ± 7.70	171.27± 8.56	151.91±7.60	168.78± 8.44
0.7	145.43 ± 7.27	170.10±8.50	142.82± 7.14	167.51±8.38
0.8	144.34 ± 7.23	170.55±8.53	141.56±7.08	167.94± 8.40
0.9	139.64 ± 6.98	172.70±8.63	136.50±6.82	170.17± 8.51
Average	158.56 ± 7.93	171.89± 8.59	156.82±7.84	169.47±8.47

Table S2 Expressions for $g(\alpha)$ reaction model to describe the reaction kinetics in heterogeneous solid state systems.

Mechanism	Symbols	Formula of $g(\alpha)$
Mampel power law (n=2)	P_2	$2\alpha^{1/2}$
Mampel power law (n=3)	P_3	$1.5\alpha^{2/3}$
Mampel power law (n=4)	P_4	$4\alpha^{3/4}$
Avrami-Erofeev eq.	A_2	$[-\ln(1-\alpha)]^{1/2}$
Avrami-Erofeev eq.	A_3	$[-\ln(1-\alpha)]^{1/3}$
Avrami-Erofeev eq.	A_4	$[-\ln(1-\alpha)]^{1/4}$
Avrami-Erofeev eq.	$A_{3/2}$	$[-\ln(1-\alpha)]^{2/3}$
Power law	R_1	α
Power law	R_2	$1-(1-\alpha)^{1/2}$
Power law	R_3	$1-(1-\alpha^{1/3}$
Parabolic law	D_1	α^2
Valensi eq.	D_2	$\alpha+(1-\alpha)[\ln(1-\alpha)]$
Jander eq.	D_3	$[1-(1-\alpha)^{1/3}]^2$
Anti-Ginstling-Brounstein eq.	D_4	$1-(2\alpha/3)-(1-\alpha)^{2/3}$
Anti -Zhuravlev eq.	D_5	$[(1+\alpha)^{1/3}-1]^2$
First order (Mampel)	F_1	$-\ln(1-\alpha)$
Second order	F_2	$(1-\alpha)^{-1}-1$
Third order	F_3	$(1-\alpha)^{-2}-1$
Three-quarters order	$F_{3/4}$	$1-(1-\alpha)^{1/4}$
One and a half order	$F_{3/2}$	$(1-\alpha)^{-1/2}-1$