

Supplementary Material

Rh/Polymeric Carbon Nitride Porous Tubular Catalyst: Visible Light Enhanced Chlorophenols Hydrodechlorination in Base-free Aqueous Medium

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Table S1. HDC of 4-CP with Rh/PCN under base-free conditions with(+)/without(-) Red LED light^a.

Entry	hv	Time (min)	Conversion (%)	Selectivity (%)			TOF(s ⁻¹)
				C-ol	C-one	phenol	
1	+	10	50.8	19.3	0.0	80.7	0.75
2	+	20	78.0	36.0	1.1	62.9	
3	+	25	84.9	36.7	2.0	61.3	
4	+	30	100.0	49.3	2.9	47.8	
5	+	40	100.0	62.9	19.1	17.0	
6	-	20	33.1	12.6	5.2	82.2	0.24
7	-	40	54.0	19.5	2.2	78.3	
8	-	60	71.7	27.6	3.4	69.0	
9	-	80	80.9	38.7	8.3	53.0	
10	-	100	88.5	53.9	1.4	44.7	
11	+ ^b	30	84.8	36.1	0.0	63.9	NC ^c

^a Reaction conditions: 1.5 g/L of 4-CP (5.0 mL), 1.0 g/L of catalyst, temperature, 30 °C, H₂ balloon pressure.

^b Natural sunlight irradiation (2018.07.23 10:30AM).

^c NC=Not calculate.

Table S2. HDC of 4-CP catalyzed by Rh/PCN under different reaction conditions^a.

Entry	Catalyst (g/L)	4-CP (g/L)	Time (min)	Conversion (%)	Selectivity (%)		
					C-ol	C-one	phenol
1	0.5	1.5	10	30.5	14.1	1.2	84.7
	0.5	1.5	20	40.8	17.4	3.5	79.1
	0.5	1.5	30	56.9	21.9	2.6	75.5
2	1	1.5	10	50.8	19.3	0.0	80.7
	1	1.5	20	78.0	36.0	1.1	62.9
	1	1.5	30	100.0	49.3	2.9	47.8
3	1.5	1.5	10	60.3	14.1	0.5	85.4
	1.5	1.5	20	100.0	38.1	0.0	61.9
	1.5	1.5	30	100.0	43.4	2.4	54.2
4	1	1	10	61.0	20.0	1.0	79.0
	1	1	20	100.0	29.1	1.0	69.9
	1	1	30	100.0	40.6	2.1	57.4
5	1	2	10	14.9	14.0	0.0	86.0
	1	2	20	46.8	24.5	3.7	71.8
	1	2	30	81.4	43.3	0.0	56.7

^a Reaction conditions: Temperature, 30 °C, solvent, 5 mL of water, H₂ balloon pressure, 30 W Red LED lamp.

Table S3. Effect of solvents on 4-CP HDC over Rh/PCN ^a.

Entry	Solvent	Time (min)	Conversion (%)	Selectivity (%)		
				C-ol	C-one	phenol
1	H ₂ O	30	100.0	49.3	2.9	47.8
2	methanol	60	11.9	24.1	0.0	75.9
3	ethanol	60	10.1	17.9	0.0	82.1
4	isopropanol	60	9.6	31.9	3.6	64.4
5	acetone	60	6.2	39.0	0.0	61.0
6	THF	60	<1.0	-	-	100.0

^a Reaction conditions: 1.5 g/L of 4-CP (5.0 mL), 1.0 g/L of catalyst, temperature, 30 °C, H₂ balloon pressure, 30 W Red LED lamp.

Table S4. HDC of 4-CP with PCN under base-free conditions with(+)/without(-) Red LED light^a.

Entry	hv	Time (min)	Conversion (%)	Selectivity (%)		
				C-ol	C-one	phenol
1 ^b	+	120	-	-	-	-
2	+	30	1	-	-	100
3	+	120	3	76.1	14.1	9.8
4	-	30	-	-	-	-
5	-	120	1	81.4	11.8	5.9

^a Reaction conditions: 1.5 g/L of 4-CP (5.0 mL), 1.0 g/L of catalyst, temperature, 30 °C, H₂ balloon pressure.

^b without catalyst.

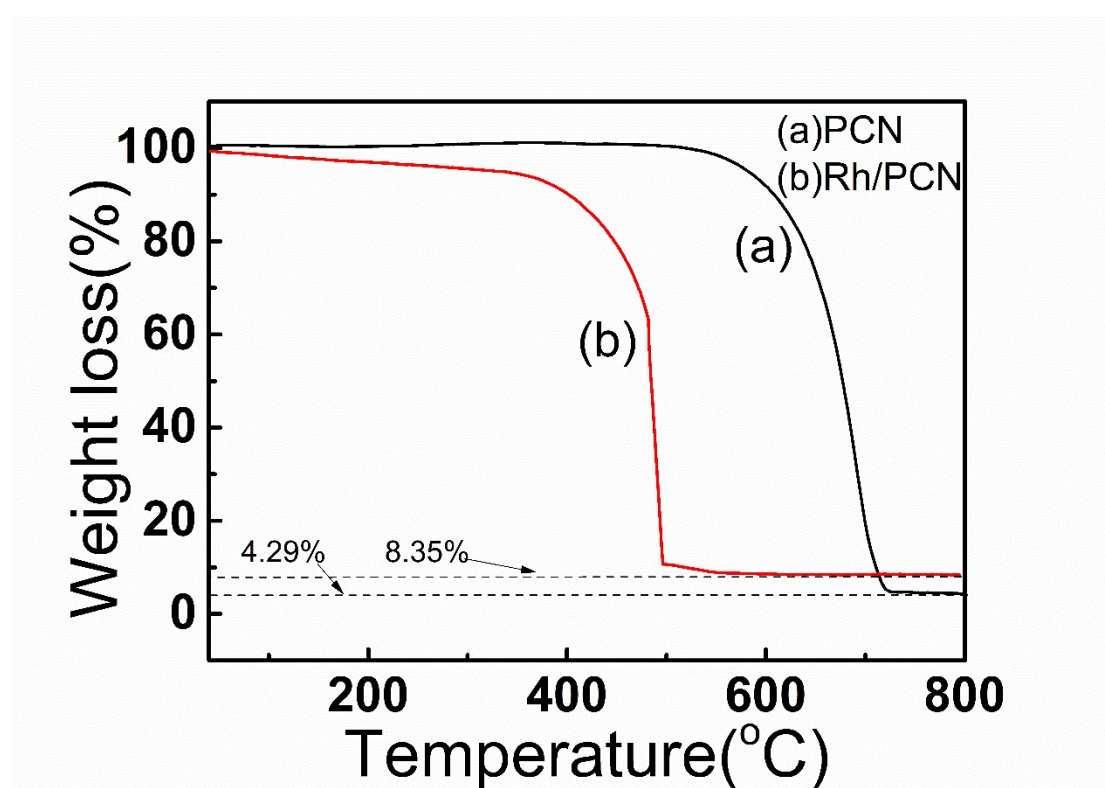


Fig. S1. TG curves of the PCN and Rh/PCN photocatalysts.

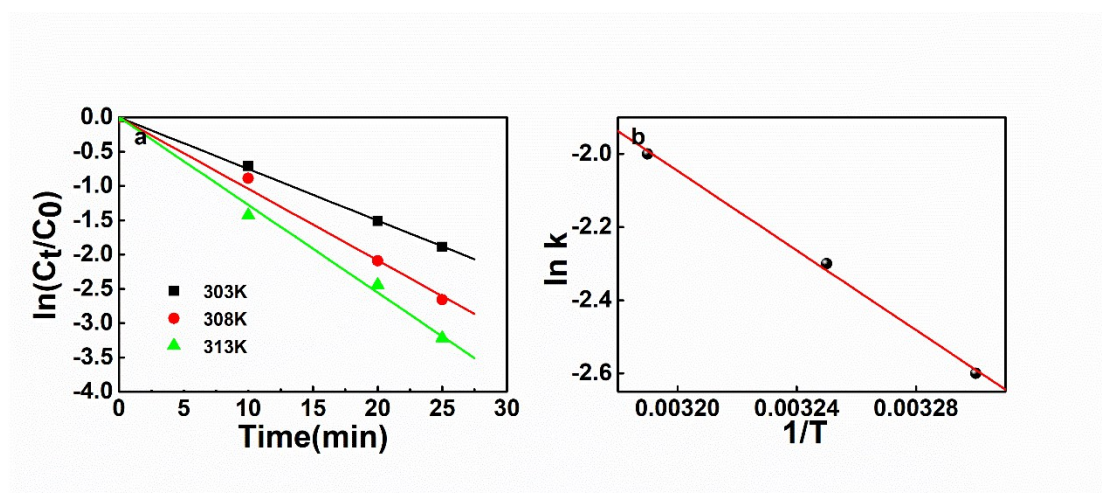


Fig. S2. a) Plots of $\ln(C_t/C_0)$ vs time for the HDC of 4-CP by Rh/PCN at different temperatures. b) The corresponding Arrhenius plots.