Electronic Supplementary Material (ESI) for Environmental Science: Nano.

SUPPORTING INFORMATION

Highly Uniform Platinum Photodeposited Hollow Mesoporous Titania Nanoparticles for Photocatalytic Degradation of Phenol

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KEYWORDS: Hollow mesoporous titania, Photocatalysis, Phenol degradation, Platinum photodeposition, Radical mechanism

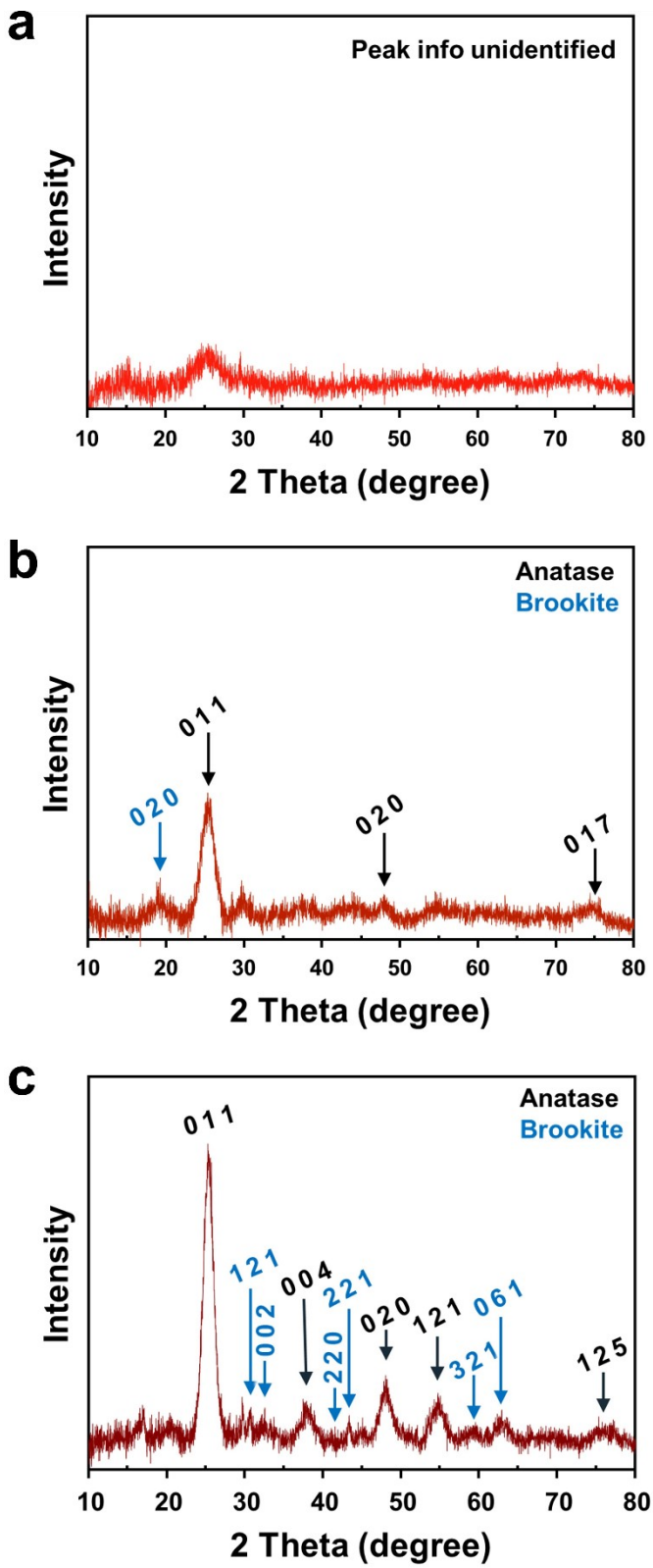

Fig. S1. XRD patterns of c-HMTN calcined under (a) 500 ℃, (b) 610 ℃, (c) 720 ℃

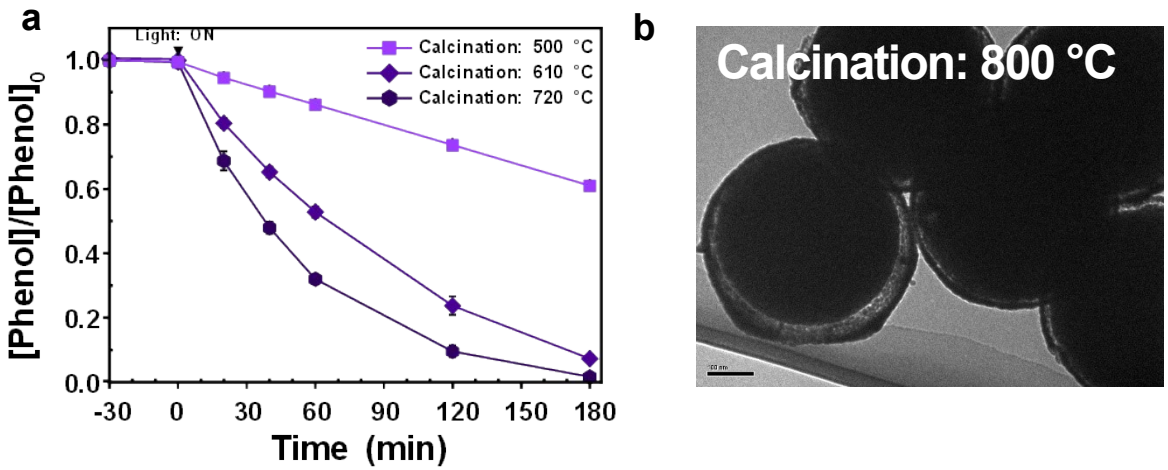

Fig. S2. a) Photocatalytic activity of c-HMTN corresponding to different calcination temperatures b) TEM image of c-HMTN calcined at 800 ℃

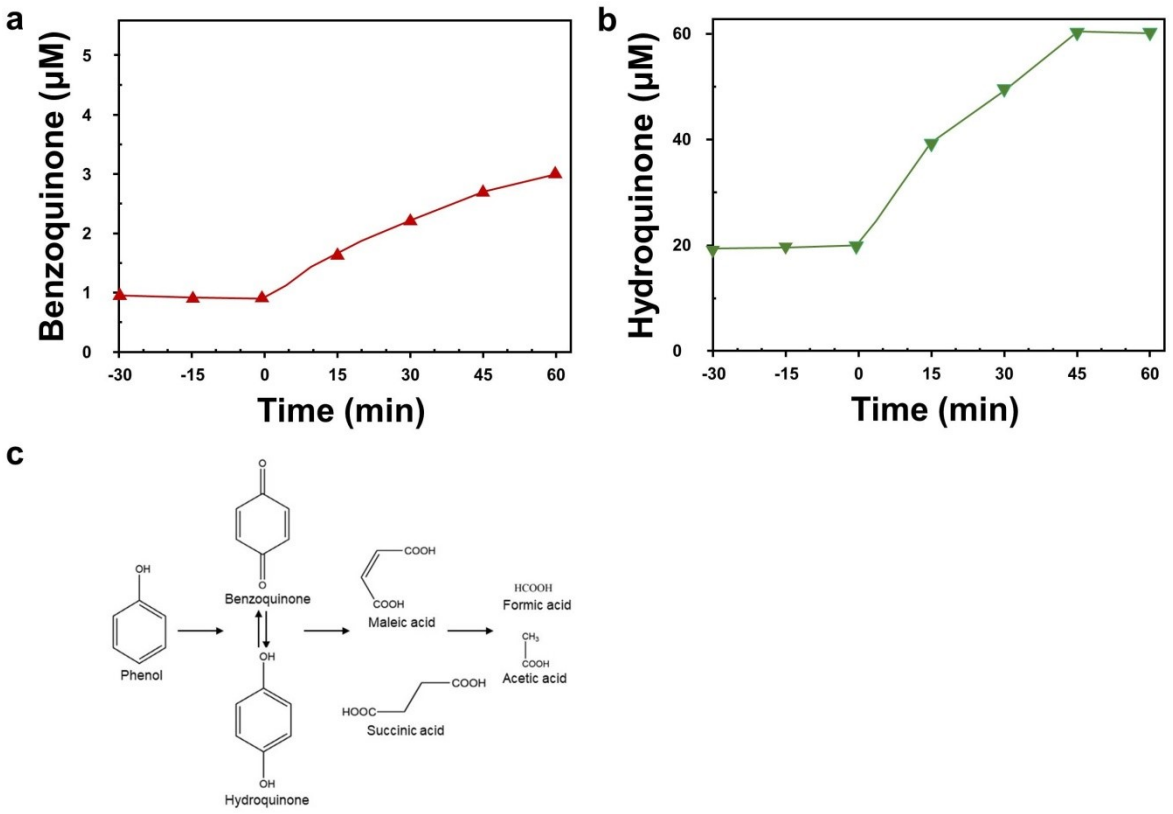

Fig. S3. a) Phenol degradation primary product HPLC test of a) Benzoquinone b) Hydroquinone and c) phenol degradation overall pathway

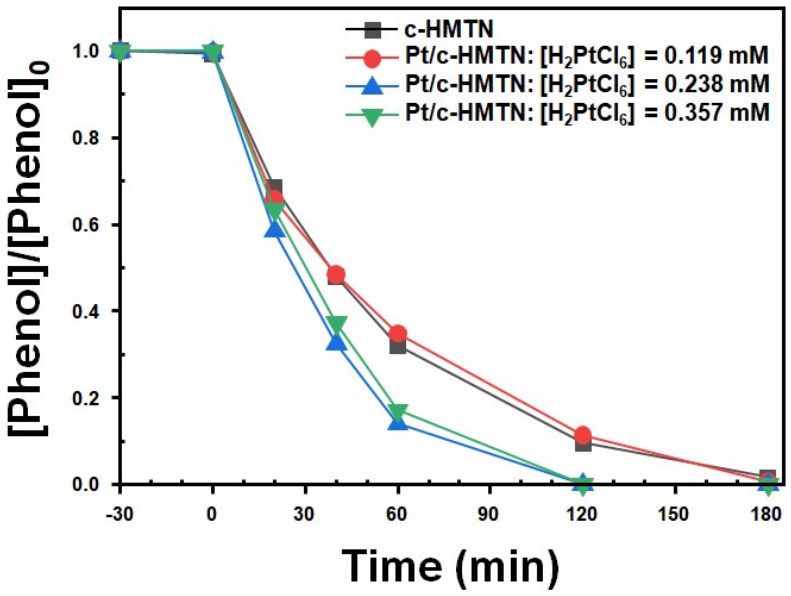

Fig. S4. Effect of Pt precursor concentration on Pt/c-HMTN catalytic performance.
([Catalyst] = 500 ppm; $[Phenol]_0$ = 10 ppm; Dark phase time = 30 min; UV power = 20 W; Reaction time = 180 min)

Table S1

Photocatalyst	Shape	Average size	Light source	Catalytic activity*	Reference
	Uniformity	Uniformity			
PAN-CNT/TiO_2-NH_2	Nanotube	D: ~500 nm L: several mm	UV	20 min	1
	Middle	Middle			
SnO_2:Sb	Random-shaped	~2.3 nm	UV-Vis	150 min	2
	Low	Middle			
Au, Pt modified ZnO	Hollow sphere	Up to 1 mm	UV	120 min	3
	Low	Low			
Degussa P25	Random-shaped	~25 nm	UV-Vis	300 min	4
	Low	Low			
Mesoporous Pd@mTiO_2	Core-shell	~20 nm	UV	120 min	5
	Low	Low			
N-doped TiO_2	Unspecified	Unspecified	UV	210 min	6
F-doped TiO_2	Hollow nanocube	200~400 nm Middle	Vis	60 min	7
	Middle	Middle			
Pt/c-HMTN (This study)	Hollow sphere	450~500 nm	UV-Vis	60 min	
	High	High			

*Average time to degrade 95% of initial phenol

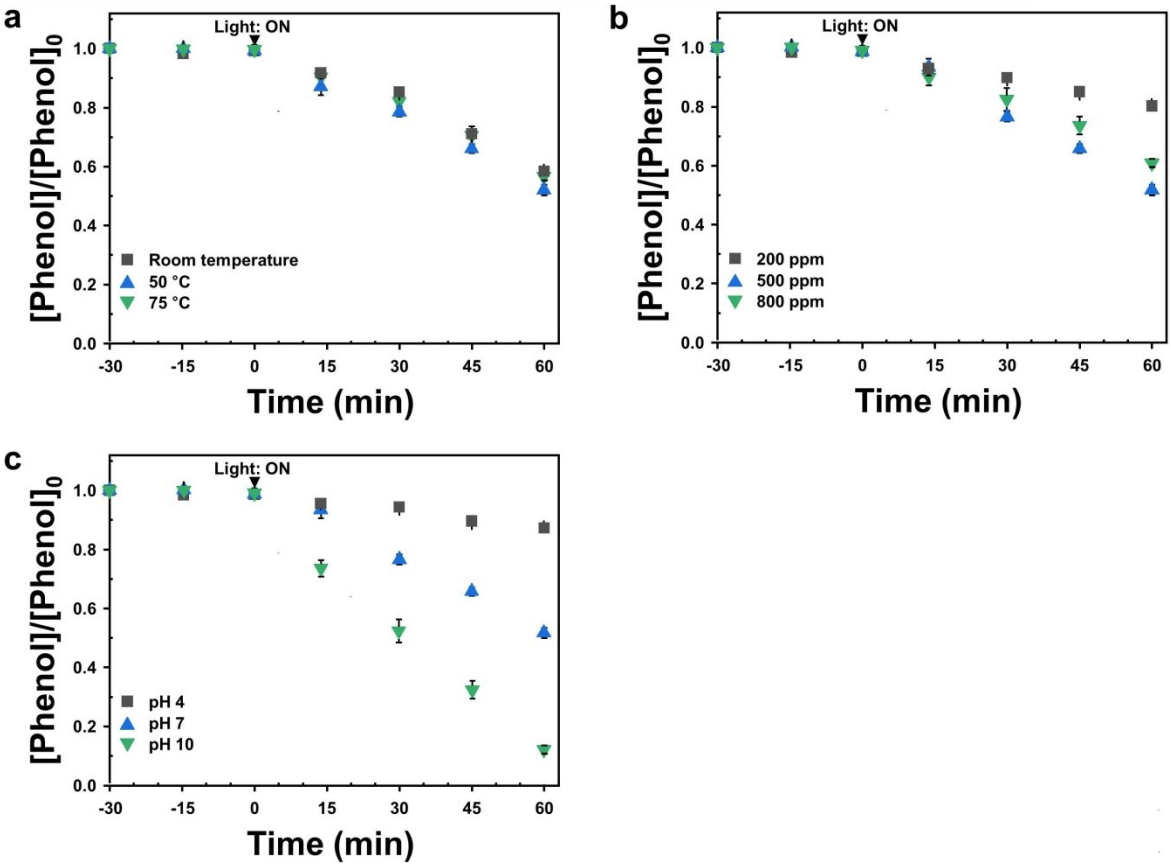

Fig. S5. a) Photocatalytic activity of Pt/c-HMTN corresponding to a) reaction temperatures, b) catalyst dosage and c)pH ($[Phenol]_0$ = 10 ppm; Dark phase time = 30 min; Solar simulator power = 1 SUN; Reaction time = 60 min)

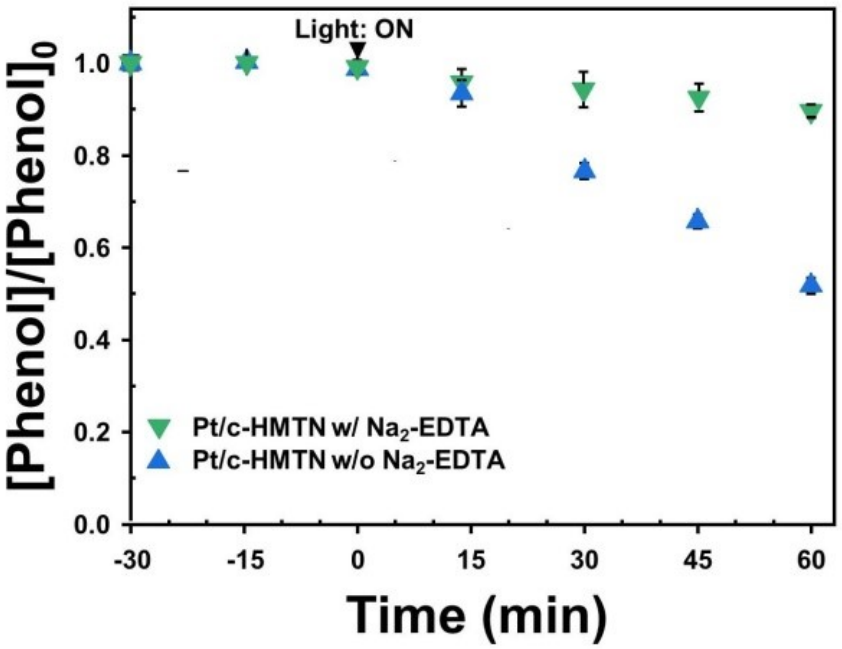

Fig. S6. Hole-trapping scavenger test of Pt/c-HMTN in the presence Na_2-EDTA versus Pt/c-HMTN without adding Na_2-EDTA. ([Catalyst] = 500 ppm; [Phenol]0 = 10 ppm; [Na_2-EDTA] = 20 mM; Dark phase time = 30 min; Solar simulator power = 1 SUN; Reaction time = 60 min)

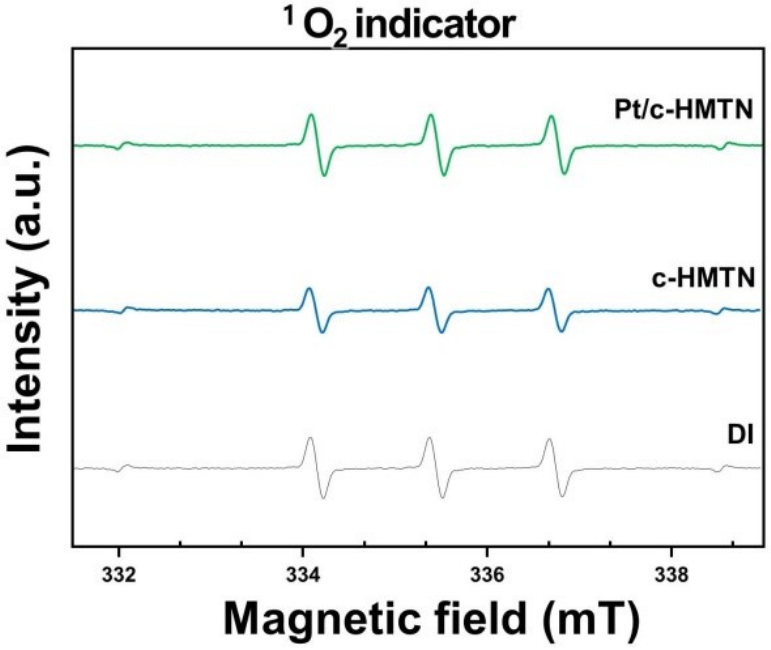

Fig. S7. EPR spectra of Blank (DI), c-HMTN vs Pt/c-HMTN for $^1O_2$ signal peaks in the presence of light

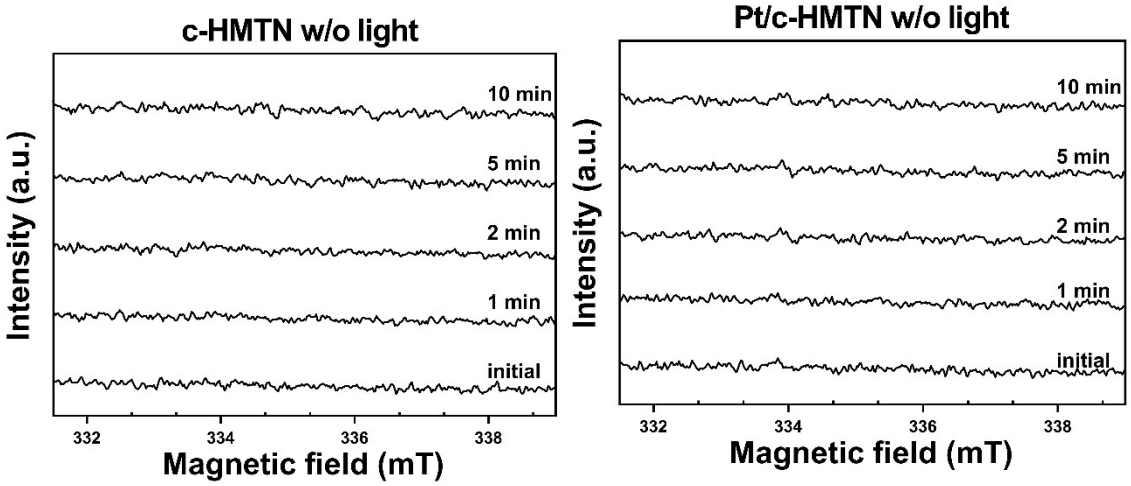

Fig. S8. EPR spectra of c-HMTN, Pt/c-HMTN at different timeframes without the presence of light

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