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APPENDICES

Appendix A N₂ Adsorption-Desorption Analysis of Pt-Loaded Mesoporous-Assembled TiO₂

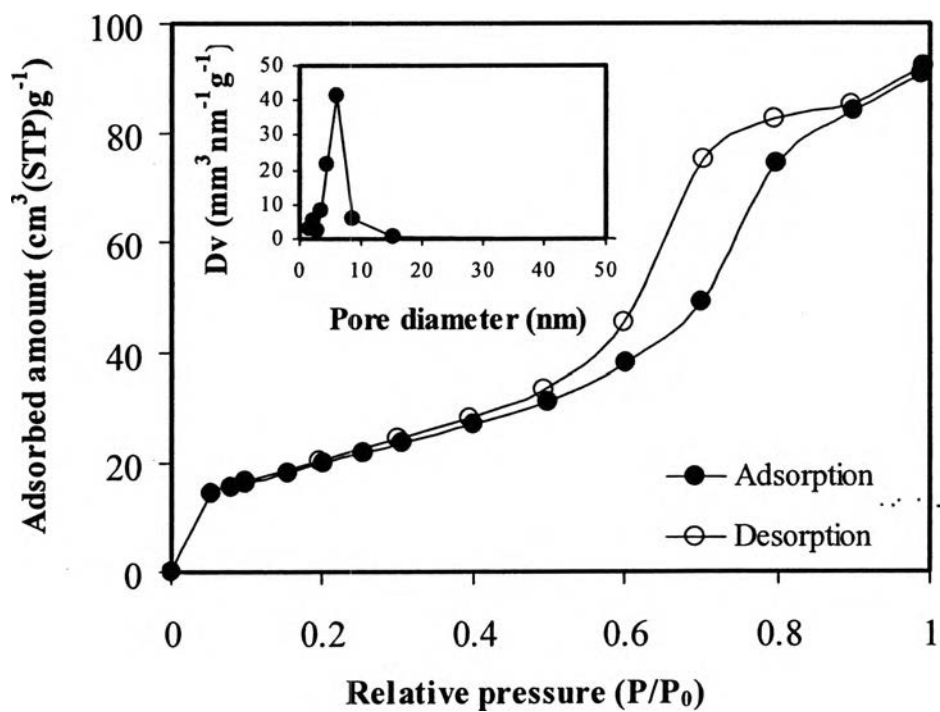


Figure A1 N₂ adsorption-desorption isotherms of the synthesized 0.2 wt.% Pt-loaded mesoporous-assembled TiO₂ calcined at 500°C for 4 h (Inset: Pore size distribution).

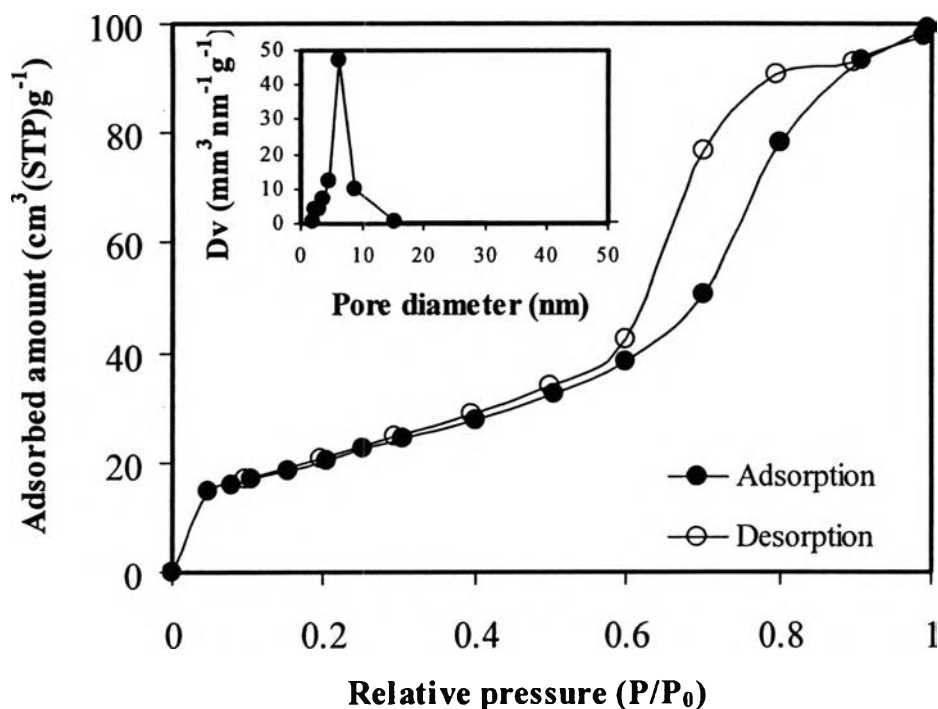


Figure A2 N_2 adsorption-desorption isotherms of the synthesized 0.4 wt.% Pt-loaded mesoporous-assembled TiO_2 calcined at $500^\circ C$ for 4 h (Inset: Pore size distribution).

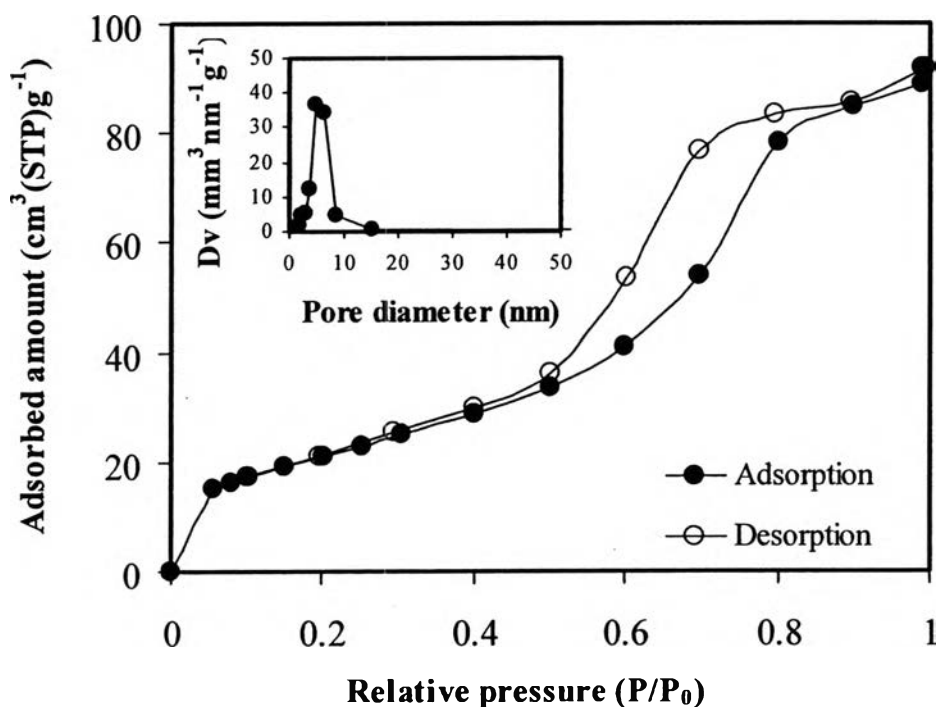


Figure A3 N_2 adsorption-desorption isotherms of the synthesized 0.8 wt.% Pt-loaded mesoporous-assembled TiO_2 calcined at $500^\circ C$ for 4 h (Inset: Pore size distribution).

Appendix B Example of Time Dependence of UV-Vis Absorption Spectra of MO Solution

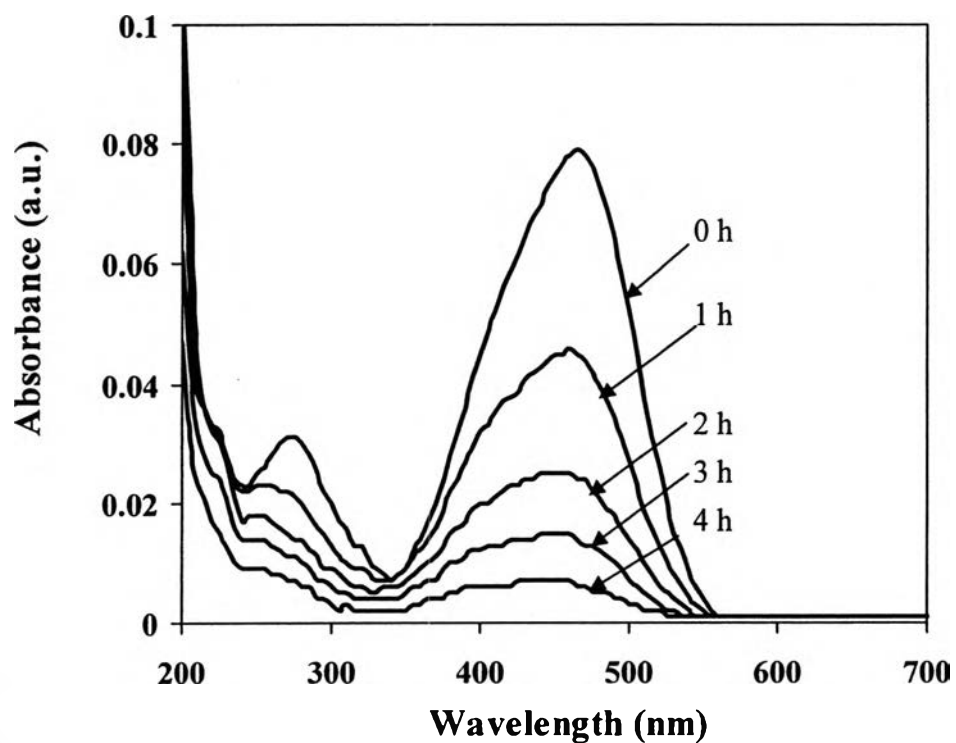


Figure B1 UV-Vis absorption spectra of methyl orange solution at various irradiation times (photocatalyst dosage = 2 g/l; initial MO concentration = 5 mg/l; reaction volume = 80 ml)

Appendix C Comparison of Reaction Rate Constants for MO Decomposition under Various Operating Conditions

Table C1 Comparison of effect of photocatalyst dosage on reaction rate constants for both decolorization and degradation of MO by synthesized mesoporous-assembled TiO₂ photocatalyst calcined at 500°C for 4 h (initial MO concentration = 5 mg/l; reaction volume = 80 ml; irradiation time = 4 h).

Photocatalyst dosage (g/l)	Reaction rate constant, k (h ⁻¹)	
	Decolorization	Degradation
2	0.615	0.363
6	0.779	0.568
7	1.066	0.681
8	0.849	0.587
10	0.256	0.193

Table C2 Comparison of effect of initial MO concentration on reaction rate constants for both decolorization and degradation of MO by synthesized mesoporous-assembled TiO₂ photocatalyst calcined at 500°C for 4 h (photocatalyst dosage = 7 g/l; reaction volume = 80 ml; irradiation time = 4 h)

Initial MO concentration (mg/l)	Reaction rate constant, k (h ⁻¹)	
	Decolorization	Degradation
2.5	0.933	0.622
5	1.066	0.681
10	2.561	0.193
15	0.068	0.071

Table C3 Comparison of effect of light intensity on reaction rate constants for both decolorization and degradation of MO by synthesized mesoporous-assembled TiO₂ photocatalyst calcined at 500°C for 4 h (photocatalyst dosage = 7 g/l; initial MO concentration = 5 mg/l; reaction volume = 80 ml; irradiation time = 4 h)

Light intensity (mW/cm ²)	Reaction rate constant, k (h ⁻¹)	
	Decolorization	Degradation
0.58	0.175	0.113
1.16	0.309	0.206
1.74	0.593	0.277
2.32	1.066	0.681

Table C4 Comparison of effect of H₂O₂ concentration on reaction rate constant for decolorization of MO by synthesized mesoporous-assembled TiO₂ photocatalyst calcined at 500°C for 4 h (photocatalyst dosage = 7 g/l; initial MO concentration = 5 mg/l; reaction volume = 80 ml; irradiation time = 4 h).

H ₂ O ₂ concentration (M)	Decolorization rate constant, k (h ⁻¹)
0	1.066
0.1	1.010
0.3	1.210
0.5	1.974
0.7	1.792
0.9	1.712

Table C5 Comparison of effect of initial solution pH on reaction rate constant for decolorization of MO by synthesized mesoporous-assembled TiO₂ photocatalyst calcined at 500°C for 4 h (photocatalyst dosage = 0.2 g/l; initial MO concentration = 5 mg/l; H₂O₂ concentration = 0.5 M; reaction volume = 80 ml; irradiation time = 4 h)

Initial solution pH	Decolorization rate constant, k (h ⁻¹)
3.1	1.281
4.1	1.775
4.7	1.974
7.0	1.010
8.0	0.985

Table C6 Comparison of effect of Pt loading content on reaction rate constant for decolorization of MO by synthesized Pt-loaded mesoporous-assembled TiO₂ photocatalyst calcined at 500°C for 4 h (photocatalyst dosage = 0.2 g/l; initial MO concentration = 5 mg/l; H₂O₂ concentration = 0.5 M; reaction volume = 80 ml; irradiation time = 4 h)

Pt loading content (wt.%)	Decolorization rate constant, k (h ⁻¹)
0.0	1.974
0.2	1.863
0.4	2.102
0.6	2.159
0.8	0.997

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