



## Supplementary Material

### Chemical Methodologies

# Photodegradation of Tramadol Using $\alpha$ -Fe<sub>2</sub>O<sub>3</sub> nanoparticles/ 12-tungstosilicic Acid as an Efficient Photocatalyst in Water Sample Employing Box-Behnken Design

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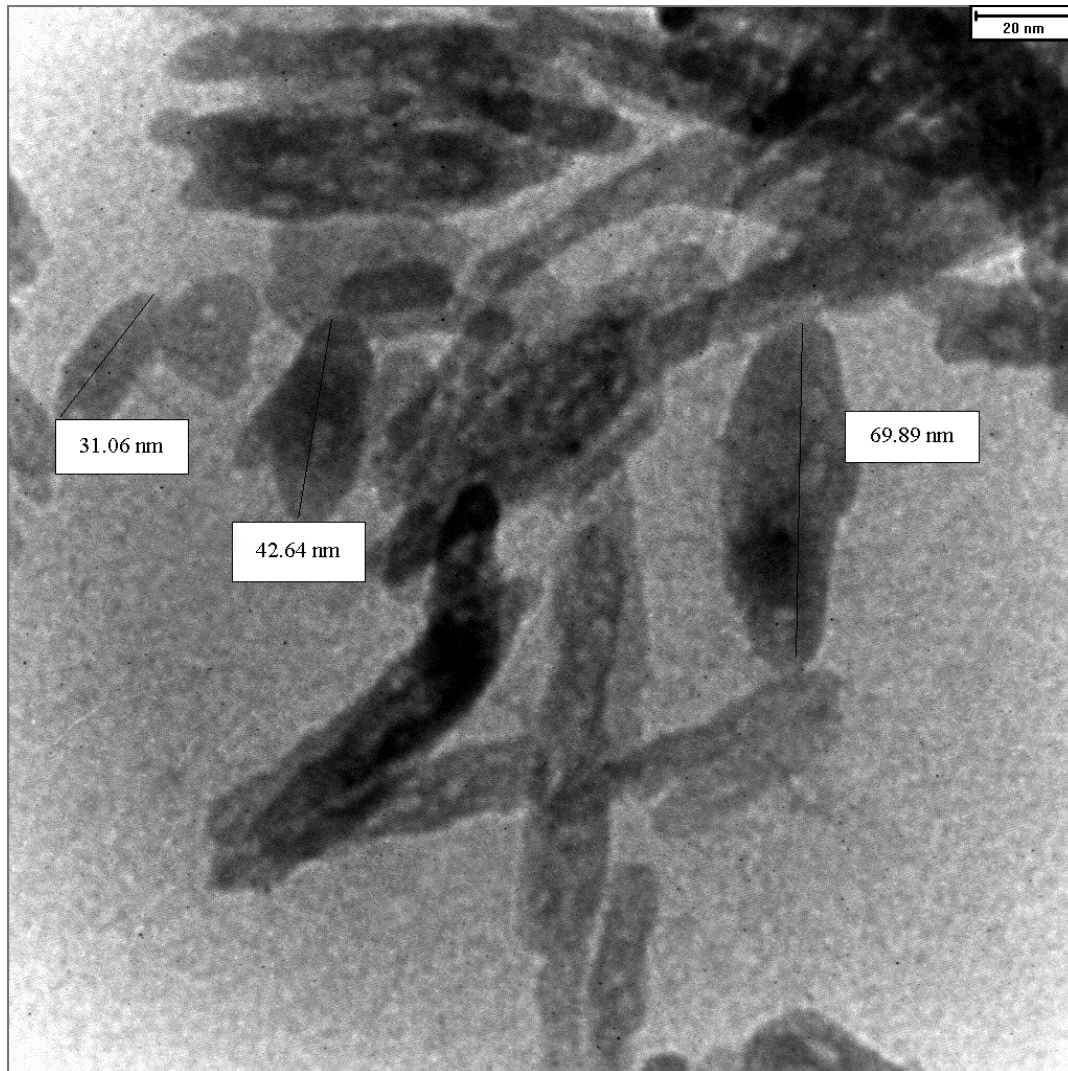
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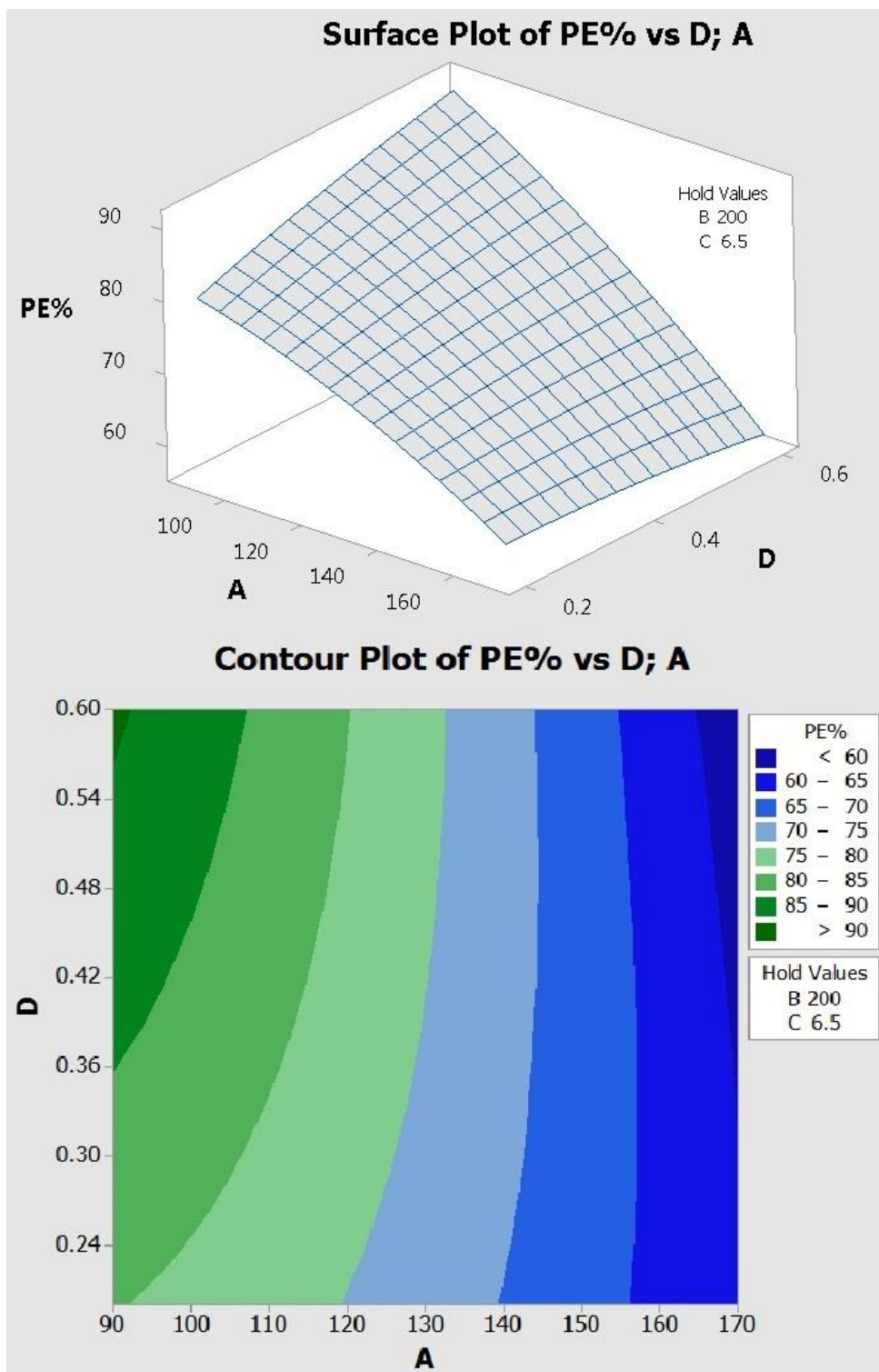
**Figure S1:** TEM image of the  $\alpha$ -Fe<sub>2</sub>O<sub>3</sub> nanoparticles/ 12-TSA.7H<sub>2</sub>O



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**Figure S2:** Surface and contour plots for the effect of the interaction between Tra concentration and hydrogen peroxide concentration.



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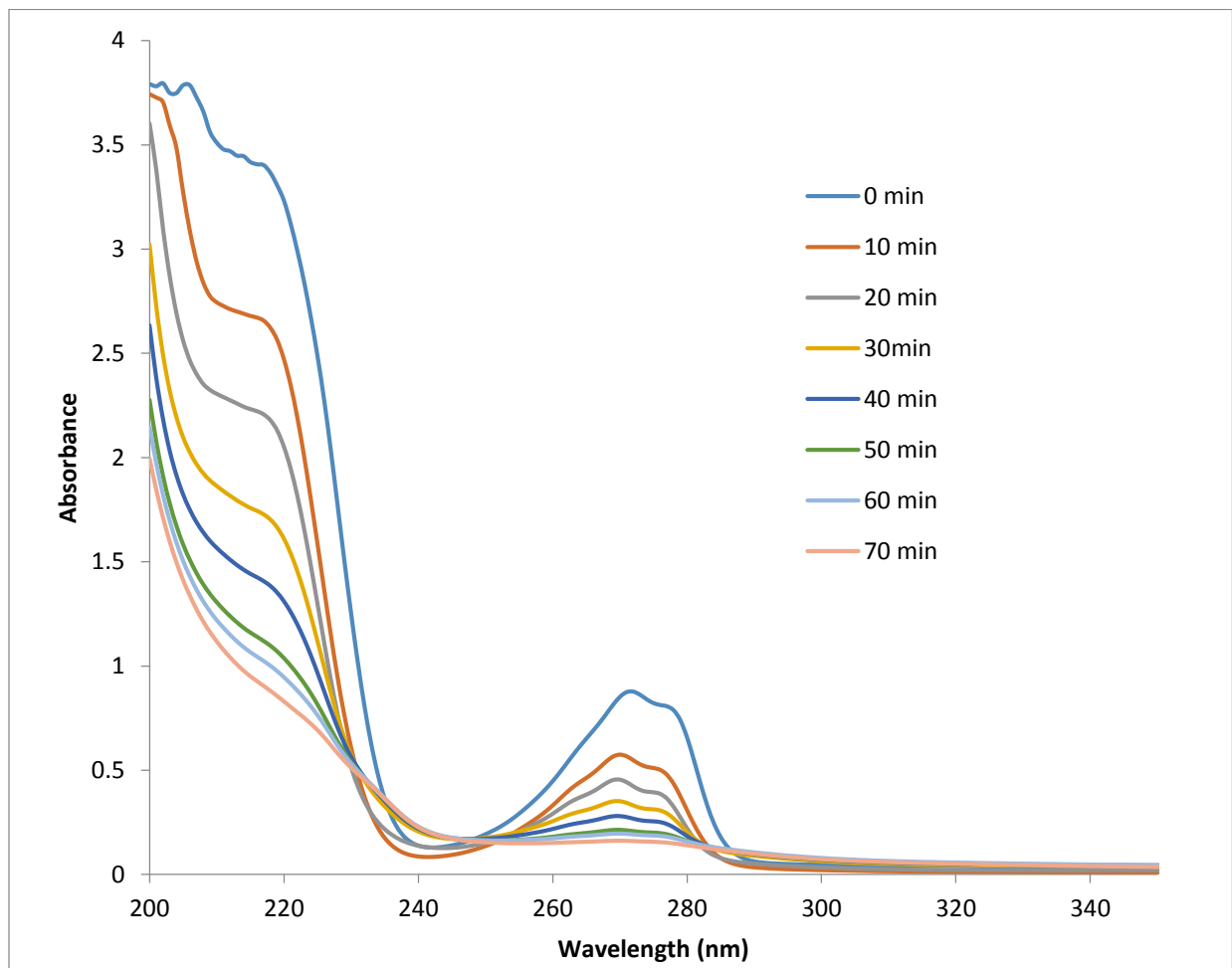
**Figure S3:** The optimization plot for Tra degradation efficiency with  $\alpha$ -Fe<sub>2</sub>O<sub>3</sub> nanoparticles/ 12-TSA.7H<sub>2</sub>O



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**Figure S4:** Spectrophotometric spectra for the Tra degradation at intervals of 0-70 min



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**Table S1** : The EDX quantitative results of the  $\alpha$ -Fe<sub>2</sub>O<sub>3</sub> nanoparticles/ 12-TSA.7H<sub>2</sub>O

Elt	Line	Int	Error	K	Kr	W%	A%	ZAF	Formula	Ox%	Pk/Bg	Class	LConf	HConf	Cat#
<b>Si</b>	Ka	5.9	72.8863	0.0124	0.0122	2.33	4.65	0.5235		0.00	3.21	B	2.08	2.57	0.00
<b>Fe</b>	Ka	145.3	0.9495	0.9573	0.9379	93.55	94.09	1.0027		0.00	41.40	A	91.54	95.55	0.00
<b>W</b>	La	0.9	1.5157	0.0303	0.0297	4.13	1.26	0.7194		0.00	2.20	B	2.98	5.28	0.00
				1.0000	0.9798	100.00	100.00			0.00					0.00