

*Supplementary Information for:*

## **A New Step-based Photoreactor for Degradation of Acid Dye Using N-TiO<sub>2</sub>-P25- coated Ceramic Foam under Visible Light**

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**Table S1.** Experimental designs and experimental results with predicted values

Run	Expercimental conditions				Acid Red 73 degradation (%)	
	X1	X2	X3	X4	Experimental	Predicative
1	600.00	10.00	0.50	35.00	18.00	21.29
2	800.00	7.50	1.63	22.50	38.00	38.46
3	400.00	12.50	1.63	47.50	15.00	17.75
4	800.00	7.50	0.88	22.50	28.00	25.75
5	600.00	10.00	1.25	10.00	10.00	12.29
6	800.00	12.50	0.88	22.50	13.00	10.96
7	800.00	7.50	0.88	47.50	35.00	35.96
8	400.00	12.50	0.88	22.50	18.00	16.08
9	400.00	7.50	0.88	22.50	28.00	28.63
10	600.00	10.00	2.00	35.00	25.00	22.46
11	600.00	10.00	1.25	35.00	47.00	45.75
12	600.00	10.00	1.25	35.00	46.00	45.75
13	800.00	12.50	1.63	47.50	21.00	19.13
14	1000.00	10.00	1.25	35.00	30.00	29.13
15	400.00	12.50	1.63	22.50	12.00	9.79
16	600.00	10.00	1.25	35.00	44.00	45.75
17	600.00	10.00	1.25	35.00	45.00	45.75
18	200.00	10.00	1.25	35.00	29.00	30.63
19	600.00	10.00	1.25	35.00	47.50	45.75
20	600.00	15.00	1.25	35.00	13.00	14.46
21	800.00	12.50	1.63	22.50	16.00	18.42
22	400.00	12.50	0.88	47.50	31.00	29.29
23	400.00	7.50	0.88	47.50	48.00	46.08
24	600.00	10.00	1.25	60.00	32.00	30.46
25	600.00	10.00	1.25	35.00	45.00	45.75
26	600.00	5.00	1.25	35.00	52.00	51.29
27	400.00	7.50	1.63	47.50	39.00	39.79
28	400.00	7.50	1.63	22.50	28.00	27.58
29	800.00	12.50	0.88	47.50	16.00	16.92
30	800.00	7.50	1.63	47.50	41.00	42.43

**Table S2.** Coefficients of regression and their significances

<b>Factor</b>	<b>Coefficient estimate</b>	<b>Degree of freedom</b>	<b>Standard error</b>	<b>F-value</b>	<b>95% confidence interval Low</b>	<b>95% confidence interval High</b>	<b>p-value</b>
<b>Intercept</b>	45.75	1	1.00	-	43.62	47.88	-
<b>x<sub>1</sub></b>	-0.38	1	0.50	0.56	-1.44	0.69	0.4652
<b>x<sub>2</sub></b>	-9.21	1	0.50	338.70	-10.27	-8.14	< 0.0001
<b>x<sub>3</sub></b>	0.29	1	0.50	0.34	-0.77	1.36	0.5686
<b>x<sub>4</sub></b>	4.54	1	0.50	82.39	3.48	5.61	< 0.0001
<b>x<sub>1</sub> x<sub>2</sub></b>	-0.56	1	0.61	0.84	-1.87	0.74	0.3732
<b>x<sub>1</sub> x<sub>3</sub></b>	3.44	1	0.61	31.47	2.13	4.74	< 0.0001
<b>x<sub>1</sub> x<sub>4</sub></b>	-1.81	1	0.61	8.75	-3.12	-0.51	0.0098
<b>x<sub>2</sub> x<sub>3</sub></b>	-1.31	1	0.61	4.59	-2.62	-6.353E-003	0.0490
<b>x<sub>2</sub> x<sub>4</sub></b>	-1.06	1	0.61	3.01	-2.37	0.24	0.1034
<b>x<sub>3</sub> x<sub>4</sub></b>	-1.31	1	0.61	4.59	-2.62	-6.353E-003	0.0490
<b>x<sub>1</sub><sup>2</sup></b>	-3.97	1	0.47	71.90	-4.97	-2.97	< 0.0001
<b>x<sub>2</sub><sup>2</sup></b>	-3.22	1	0.47	47.30	-4.22	-2.22	< 0.0001
<b>x<sub>3</sub><sup>2</sup></b>	-5.97	1	0.47	162.64	-6.97	-4.97	< 0.0001
<b>x<sub>4</sub><sup>2</sup></b>	-6.09	1	0.47	169.52	-7.09	-5.10	< 0.0001

**Table S3.** Optimization of the individual responses (di) to find the overall desirability response (D)

<b>Name</b>	<b>Goal</b>	<b>Lower Limit</b>	<b>Upper Limit</b>	<b>Lower weight</b>	<b>Upper weight</b>	<b>Importance</b>
Flow rate	In the range	200	1000	1	1	<b>3</b>
Initial dye concentration	In the range	5	15	1	1	<b>3</b>
H <sub>2</sub> O <sub>2</sub> concentration	In the range	0.5	2	1	1	<b>3</b>
Dipping time of the support into the sol	In the range	10	60	1	1	<b>3</b>
Response (degradation %)	<b>Maximize</b>	<b>10</b>	<b>52</b>	<b>1</b>	<b>1</b>	<b>5</b>