Electronic Supplementary Material (ESI) for RSC Advances

Supporting Information Data

Enhanced Photovoltaic Properties of TiO_2 Film Prepared by Polycondensation in Sol Reaction

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Table S1. Langmuir isotherm parameters of N719 dye on various TiO_2 films at three different temperatures

Sample No.	Temperature, K	q_m	b	[a]E, %
KYJ-1F	303.15	23.96	5.214	0.956
	318.15	24.02	10.25	1.411
	333.15	30.98	13.73	1.859
KYJ-2F	303.15	44.47	6.716	0.922
	318.15	50.37	12.10	1.615
	333.15	54.57	15.09	4.916
KYJ-3F	303.15	50.16	6.754	5.578
	318.15	56.69	12.39	2.094
	333.15	60.73	15.19	4.011
KYJ-4F	303.15	34.49	5.927	1.983
	318.15	35.00	11.32	1.965
	333.15	41.04	14.23	2.481
KYJ-5F	303.15	65.46	8.401	3.158
	318.15	67.61	12.42	3.000
	333.15	69.78	15.69	5.083
KYJ-6F	303.15	73.72	9.120	3.945
	318.15	75.76	12.64	2.850
	333.15	76.33	16.47	4.972

a:Average percent error, $E(\%) = 100/\mathrm{N}\sum_{i=1}^{N}[|q_{cal,i} - q_{exp,i}/q_{cal,i}|]$

Table S2. Langmuir-Freundlich isotherm parameters of N719 dye on various TiO_2 films at three different temperatures

Sample No.	Temperature, K	q_m	b	n	[a]E, %
KYJ-1F	303.15	24.04	5.18	0.998	0.347
	318.15	24.25	10.03	0.990	0.753
	333.15	31.38	13.32	0.984	1.336
KYJ-2F	303.15	45.55	6.38	0.985	0.845
	318.15	51.55	11.46	0.974	1.039
	333.15	56.34	13.93	0.970	3.641
KYJ-3F	303.15	51.30	6.43	0.983	4.885
	318.15	58.35	11.57	0.967	2.258
	333.15	62.21	14.34	0.968	4.798
KYJ-4F	303.15	34.64	5.87	0.997	1.857
	318.15	35.40	11.03	0.988	1.362
	333.15	41.65	13.74	0.981	2.033
KYJ-5F	303.15	66.89	8.00	0.981	0.704
	318.15	69.78	11.52	0.964	2.741
	333.15	72.87	14.12	0.944	2.780
KYJ-6F	303.15	74.82	8.84	0.978	0.884
	318.15	78.45	11.63	0.960	3.881
	333.15	79.74	14.80	0.941	4.980

a:Average percent error, $E(\%) = 100/\mathrm{N}\sum_{i=1}^{N}\left[\left|q_{cal,i} - q_{exp,i}/q_{cal,i}\right|\right]$

Table S3. Langmuir isotherm parameters of N719 dye on various TiO_2 films in terms of pH at 333.15 K

Sample No.	pH	q_m	b	[a]E, %
KYJ-1F	3	29.62	60.03	1.917
	5	26.70	46.79	0.730
	7	20.18	35.32	1.306
KYJ-2F	3	43.39	66.79	4.157
	5	38.78	62.62	2.588
	7	26.30	55.11	3.052
KYJ-3F	3	57.66	69.52	1.210
	5	52.63	64.35	2.034
	7	39.54	55.96	3.672
KYJ-4F	3	42.90	61.32	3.618
	5	38.15	59.34	2.246
	7	25.70	45.63	3.922
KYJ-5F	3	58.30	81.50	2.778
	5	52.75	78.94	1.686
	7	39.94	65.72	1.452
KYJ-6F	3	76.39	86.74	1.604
	5	69.49	79.79	2.321
	7	49.25	67.35	0.925

a:Average percent error, $E(\%) = 100/\mathrm{N}\sum_{i=1}^{N}[|q_{cal,i} - q_{exp,i}/q_{cal,i}|]$

Table S4. Langmuir isotherm parameters of N719 dye on various TiO_2 films in terms of pH at 333.15 K

Sample No.	pH	q_m	b	n	[a]E, %
	3	30.12	58.41	0.943	1.067
KYJ-1F	5	26.96	45.86	0.971	0.711
	7	20.31	34.83	0.983	1.305
	3	44.18	64.60	0.936	2.839
KYJ-2F	5	39.13	61.48	0.969	1.840
	7	26.52	54.07	0.974	1.146
	3	58.92	66.91	0.921	2.376
KYJ-3F	5	53.22	62.93	0.961	2.517
	7	39.94	54.72	0.968	4.067
	3	44.27	57.69	0.898	1.498
KYJ-4F	5	39.34	55.54	0.905	0.900
	7	26.57	42.31	0.910	2.249
	3	60.66	75.49	0.860	1.278
KYJ-5F	5	54.34	74.36	0.894	0.936
	7	41.05	61.97	0.908	2.315
	3	80.60	77.57	0.817	1.419
KYJ-6F	5	71.57	75.51	0.890	1.345
	7	50.75	63.30	0.898	2.170

a:Average percent error, $E(\%) = 100/\mathrm{N}\sum_{i=1}^{N}[|q_{cal,i} - q_{exp,i}/q_{cal,i}|]$

Table S5. AED parameters of N719 dye on various TiO_2 films in terms of pH

Sample No.	pH	Peak location, kJ/mol	Peak width, kJ/mol	Peak max, kJ/mol	Peak height, mol/kJ
KYJ-1F	3	2.94-15.34	12.40	9.24	0.176
	5	2.10-14.50	12.40	8.61	0.180
	7	1.05-13.66	12.61	7.77	0.179
KYJ-2F	3	0-18.49	18.49	9.45	0.125
	5	1.89-17.44	15.55	9.24	0.146
	7	1.05-15.97	14.92	8.82	0.153
KYJ-3F	3	4.41-15.13	10.72	9.66	0.197
	5	4.20-14.71	10.51	9.45	0.207
	7	3.99-14.08	10.09	9.24	0.214
KYJ-4F	3	0.84-17.65	16.81	9.45	0.137
	5	0-16.18	16.18	9.45	0.153
	7	0-14.50	14.50	8.40	0.164
KYJ-5F	3	3.15-18.07	14.92	9.87	0.150
	5	2.73-16.39	13.66	9.87	0.164
	7	3.99-14.92	10.93	9.66	0.195
KYJ-6F	3	3.78-16.81	13.03	10.29	0.169
	5	5.04-15.34	10.30	10.08	0.207
	7	4.20-14.50	10.30	9.45	0.211

Table S6. AED parameters of N719 dye on various TiO_2 films in terms of temperature

Sample No.	Temperature, K	Peak location, kJ/mol	Peak width, kJ/mol	Peak max, kJ/mol	Peak height, mol/kJ
KYJ-1F	303.15	0-7.14	7.14	2.94	0.227
	318.15	0-9.03	9.03	3.78	0.223
	333.15	0-10.50	10.50	4.62	0.198
KYJ-2F	303.15	0-7.56	7.56	3.15	0.238
	318.15	0-9.45	9.45	3.99	0.218
	333.15	0-11.13	11.13	4.83	0.192
KYJ-3F	303.15	0-7.56	7.56	3.15	0.241
	318.15	0-9.66	9.66	4.20	0.213
	333.15	0-11.13	11.13	5.04	0.191
KYJ-4F	303.15	0-7.35	7.35	3.15	0.236
	318.15	0-9.45	9.45	3.99	0.218
	333.15	0-10.71	10.71	4.83	0.195
KYJ-5F	303.15	0-7.98	7.98	3.36	0.242
	318.15	0-9.66	9.66	4.20	0.213
	333.15	0-11.13	11.13	4.83	0.193
KYJ-6F	303.15	0-8.19	8.19	3.78	0.237
	318.15	0-9.66	9.66	4.62	0.213
	333.15	0-11.55	11.55	5.04	0.188