

Supporting Information

Investigation of the effect of reaction parameters on microwave-assisted hydrothermal synthesis of hierarchical jasmine-flower- like ZnO nanostructures for dye-sensitized solar cells

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Note: This supplementary information contains supplementary Table S1 to S9 of solar cell parameters calculated for five DSSCs devices fabricated using the identical conditions.

Table S1 to S3 Temperature-dependent (RT – Room temperature, T-50 - at 50°C, T-125 - at 125°C),

Table S4 to S6 Power-dependent (P-50 - at power 50W, P-200 -at 200W, P-300 - at 300W), Time-dependent (T-2-2 - at 2 min ramp and 2 min hold, T-10-2 - at 10 min ramp and 2 min hold, T-10-10 - at 10 min ramp and 10 min hold) MW-HT conditions.

Table S1

RT						
Cell	J_{sc}	V_{oc}	J_{max}	V_{max}	FF	PCE
1	0.410	0.547	0.343	0.432	0.661	0.148
2	0.420	0.546	0.341	0.435	0.647	0.148
3	0.410	0.550	0.343	0.433	0.659	0.149
4	0.430	0.551	0.343	0.439	0.636	0.151
5	0.410	0.546	0.345	0.422	0.650	0.146
Average	0.416	0.548	0.343	0.432	0.650	0.148
Deviation	0.007	0.002	0.001	0.004	0.007	0.001

Table S2

T-50						
Cell	J_{sc}	V_{oc}	J_{max}	V_{max}	FF	PCE
1	0.570	0.585	0.543	0.470	0.765	0.255
2	0.580	0.589	0.516	0.478	0.722	0.247
3	0.570	0.590	0.530	0.460	0.725	0.244
4	0.570	0.582	0.520	0.480	0.752	0.250
5	0.560	0.573	0.530	0.460	0.760	0.244
Average	0.570	0.584	0.528	0.470	0.745	0.248
Deviation	0.004	0.003	0.008	0.008	0.017	0.004

Table S3

T-125						
Cell	J_{sc}	V_{oc}	J_{max}	V_{max}	FF	PCE
1	5.150	0.589	4.586	0.425	0.642	1.947
2	5.200	0.589	4.430	0.440	0.636	1.949
3	5.140	0.572	4.520	0.430	0.661	1.944
4	5.100	0.588	4.530	0.430	0.650	1.948
5	5.200	0.589	4.450	0.440	0.639	1.958
Average	5.158	0.585	4.503	0.433	0.646	1.949
Deviation	0.034	0.006	0.051	0.006	0.008	0.003

Table S4

P-50						
Cell	J_{sc}	V_{oc}	J_{max}	V_{max}	FF	PCE
1	1.480	0.539	1.245	0.390	0.609	0.486
2	1.480	0.540	1.230	0.392	0.603	0.482
3	1.470	0.539	1.240	0.390	0.610	0.484
4	1.480	0.538	1.250	0.389	0.611	0.486
5	1.491	0.539	1.246	0.393	0.609	0.490
Average	1.480	0.539	1.242	0.391	0.608	0.485
Deviation	0.004	0.000	0.006	0.001	0.002	0.002

Table S5

P-200						
Cell	J_{sc}	V_{oc}	J_{max}	V_{max}	FF	PCE
1	2.410	0.498	2.181	0.385	0.700	0.840
2	2.410	0.510	2.180	0.387	0.686	0.844
3	2.400	0.499	2.178	0.385	0.700	0.839
4	2.410	0.498	2.181	0.385	0.700	0.840
5	2.500	0.500	2.200	0.390	0.686	0.858
Average	2.426	0.501	2.184	0.386	0.694	0.844
Deviation	0.030	0.004	0.006	0.002	0.007	0.006

Table S6

P-300						
Cell	J_{sc}	V_{oc}	J_{max}	V_{max}	FF	PCE
1	6.770	0.585	5.814	0.422	0.620	2.454
2	6.800	0.590	5.820	0.423	0.614	2.462
3	6.720	0.588	5.800	0.424	0.622	2.459
4	6.900	0.585	5.790	0.426	0.611	2.467
5	6.700	0.585	5.814	0.422	0.626	2.454
Average	6.778	0.587	5.808	0.423	0.619	2.459
Deviation	0.058	0.002	0.010	0.001	0.005	0.004

Table S7

T-2-2						
Cell	J_{sc}	V_{oc}	J_{max}	V_{max}	FF	PCE
1	1.790	0.510	1.666	0.405	0.740	0.676
2	1.800	0.500	1.650	0.400	0.733	0.660
3	1.780	0.512	1.700	0.390	0.727	0.663
4	1.790	0.510	1.666	0.405	0.740	0.676
5	1.820	0.511	1.688	0.403	0.731	0.680
Average	1.796	0.509	1.674	0.401	0.734	0.671
Deviation	0.011	0.003	0.016	0.005	0.004	0.007

Table S8

T-10-2						
Cell	J_{sc}	V_{oc}	J_{max}	V_{max}	FF	PCE
1	3.870	0.500	3.318	0.350	0.600	1.161
2	3.880	0.510	3.320	0.358	0.601	1.189
3	3.900	0.520	3.350	0.355	0.586	1.189
4	3.870	0.500	3.318	0.350	0.600	1.161
5	3.890	0.500	3.320	0.353	0.603	1.172
Average	3.882	0.506	3.325	0.353	0.598	1.174
Deviation	0.010	0.007	0.010	0.003	0.005	0.009

Table S9

T-10-10						
Cell	J_{sc}	V_{oc}	J_{max}	V_{max}	FF	PCE
1	7.280	0.529	6.462	0.394	0.661	2.546
2	7.310	0.530	6.465	0.402	0.671	2.599
3	7.260	0.530	6.450	0.396	0.664	2.554
4	7.280	0.530	6.470	0.396	0.664	2.562
5	7.320	0.528	6.460	0.392	0.655	2.532
Average	7.29	0.5294	6.4614	0.396	0.663	2.559
Deviation	0.020	0.007	0.005	0.002	0.004	0.018