

## Supplementary materials

**Table S1.** Peak points (degrees) for each reaction.

$(h\ k\ l)$	ZnO-1	* ZnO-1	ZnO-2	*ZnO-2	ZnO-3
1 0 0	31.73	31.80	31.73	31.76	31.90
0 0 2	34.39	34.46	34.39	34.41	34.56
1 0 1	36.22	36.29	36.22	36.25	36.39
1 0 2	47.52	47.59	47.51	47.54	47.68
1 1 0	56.57	56.65	56.57	56.61	56.74
1 0 3	62.84	62.92	62.85	62.88	63.01
2 0 0	66.36	66.43	66.37	66.40	66.52
1 1 2	67.93	68.01	67.94	67.97	68.10
2 0 1	69.07	69.14	69.07	69.11	69.23

**Table S2.** Interplanar distances from XRD data and JCPDS card in Angstroms (Å).

$d_{(h\ k\ l)}$	ZnO-1	*ZnO-1	ZnO-2	*ZnO-2	ZnO-3	JCPDS
$d_{(1\ 0\ 0)}$	2.8201	2.8139	2.8202	2.8177	2.8053	2.8143
$d_{(0\ 0\ 2)}$	2.6078	2.6025	2.6077	2.6059	2.5954	2.6033
$d_{(1\ 0\ 1)}$	2.4804	2.4755	2.4801	2.4783	2.4689	2.4759
$d_{(1\ 0\ 2)}$	1.9136	1.9108	1.9137	1.9124	1.9072	1.9111
$d_{(1\ 1\ 0)}$	1.6269	1.6249	1.6268	1.6259	1.6224	1.6247
$d_{(1\ 0\ 3)}$	1.4787	1.4772	1.4786	1.4780	1.4753	1.4771
$d_{(2\ 0\ 0)}$	1.4086	1.4073	1.4085	1.4079	1.4057	1.4071
$d_{(1\ 1\ 2)}$	1.3799	1.3785	1.3797	1.3791	1.3769	1.3781
$d_{(2\ 0\ 1)}$	1.3599	1.3586	1.3599	1.3591	1.3570	1.3582

**Table S2.** Crystallite size (nm) for each plane and for each reaction.

Plane $(h\ k\ l)$	ZnO-1	*ZnO-1	ZnO-2	*ZnO-2	ZnO-3
(1,0,0)	34.25101	35.31218	33.50400	32.97969	39.25273
(0,0,2)	35.32513	39.71670	36.64744	35.64226	42.61004
(1,0,1)	33.31577	35.14530	32.09909	33.21824	38.60821
(1,0,2)	31.98485	34.82498	31.94804	33.38494	37.08668
(1,1,0)	29.65063	30.36739	28.60835	30.18343	33.19692
(1,0,3)	28.08755	29.71926	27.03008	29.94971	31.81658
(2,0,0)	29.60171	28.13536	24.03189	27.92483	30.05471
(1,1,2)	27.35027	27.77378	25.79189	28.47460	30.16290
(2,0,1)	27.77435	27.25916	25.88170	27.17859	29.37912