

Electronic Supplementary Information

Effect of dilution in hydrothermal process and post-synthetic annealing on the tailoring of hierarchical ZnO nanostructures

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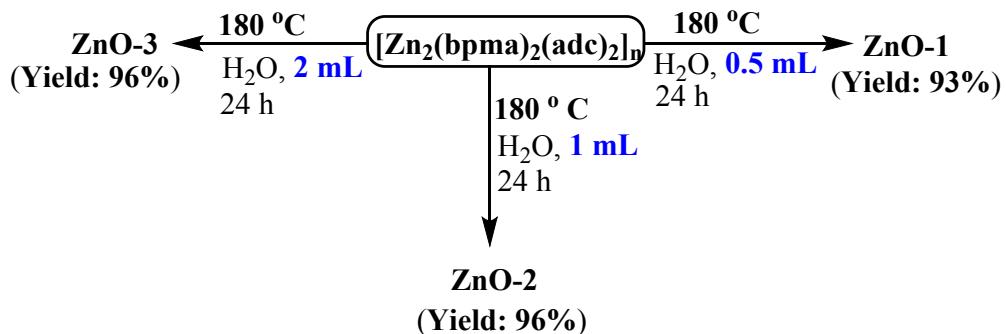
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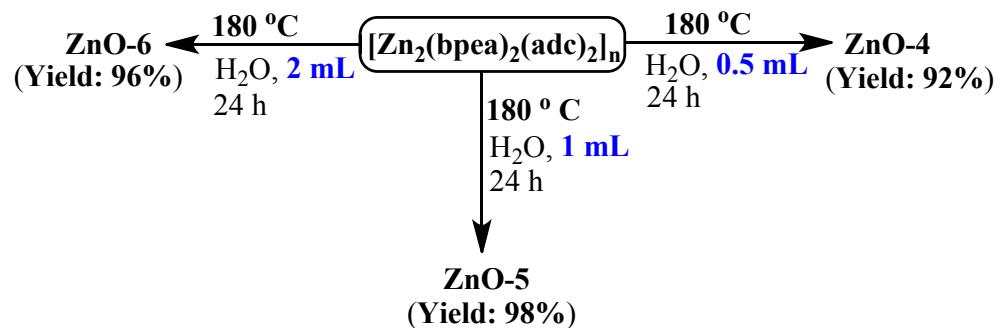
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Section S-1: Synthesis of ZnO nanostructures

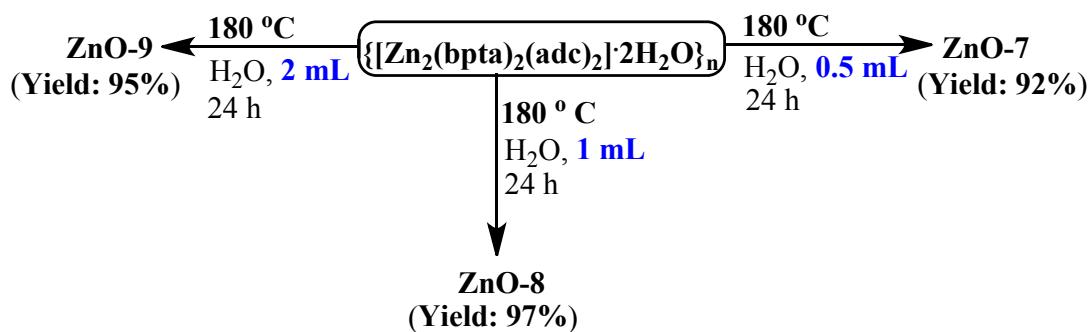
Scheme S1. Synthesis of **ZnO-1** to **ZnO-3**



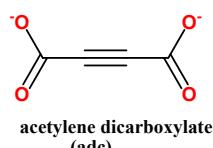
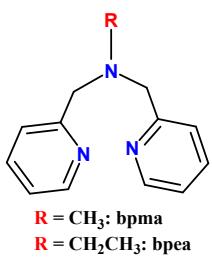
Scheme S2. Synthesis of **ZnO-4** to **ZnO-6**



Scheme S3. Synthesis of **ZnO-7** to **ZnO-9**



where,



Section-S2: Lattice parameters of as-synthesised ZnO nanostructures

Table S1. Lattice parameters for ZnO samples.

Sample	h k l	2θ values (degrees)	Lattice constants: a, b, c (Å)	Volume of unit cell (Å ³)	Atomic packing fraction	d-spacing (Å)	FWHM
ZnO-1	(100)	31.74	a = b = 3.26,	48.08	0.755	2.82	0.313
	(002)	34.42	c = 5.22			2.61	
	(101)	36.25				2.48	
ZnO-2	(100)	31.70	a = b = 3.26,	48.22	0.755	2.82	0.379
	(002)	34.40	c = 5.22			2.61	
	(101)	36.20				2.48	
ZnO-3	(100)	31.85	a = b = 3.25,	47.63	0.754	2.81	0.525
	(002)	34.51	c = 5.20			2.60	
	(101)	36.34				2.47	
ZnO-4	(100)	31.75	a = b = 3.26,	48.05	0.754	2.82	0.314
	(002)	34.42	c = 5.22			2.61	
	(101)	36.26				2.48	
ZnO-5	(100)	31.74	a = b = 3.26,	48.08	0.755	2.82	0.335
	(002)	34.42	c = 5.22			2.61	
	(101)	36.24				2.48	
ZnO-6	(100)	31.73	a = b = 3.26,	48.11	0.755	2.82	0.318
	(002)	34.42	c = 5.22			2.61	
	(101)	36.23				2.48	
ZnO-7	(100)	31.74	a = b = 3.26,	48.08	0.754	2.82	0.316
	(002)	34.42	c = 5.22			2.61	
	(101)	36.26				2.48	
ZnO-8	(100)	31.70	a = b = 3.26,	48.22	0.755	2.82	0.381
	(002)	34.40	c = 5.22			2.61	
	(101)	36.20				2.48	
ZnO-9	(100)	31.83	a = b = 3.25,	47.69	0.754	2.82	0.517
	(002)	34.51	c = 5.20			2.60	
	(101)	36.32				2.47	

Section-S3: Thermal Analysis of ZnO-1a (Nanospheres)

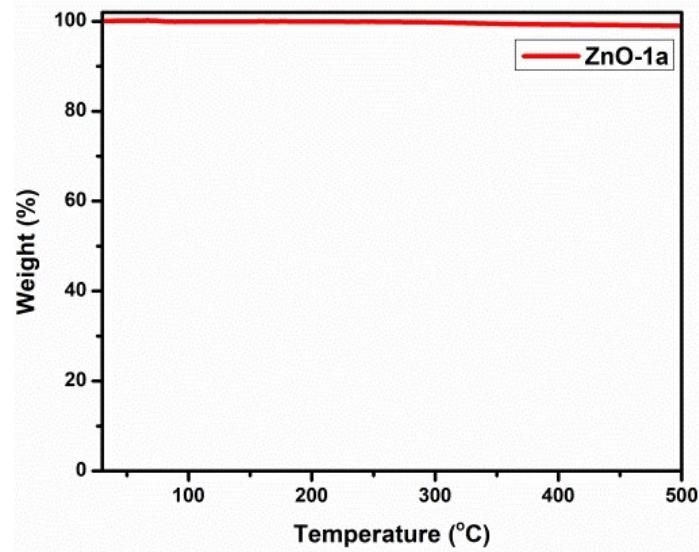


Fig. S1 TGA scan for **ZnO-1a**.

Section-S4: TEM images of ZnO-1 (Microspheres) and ZnO-5 (Microspheres)

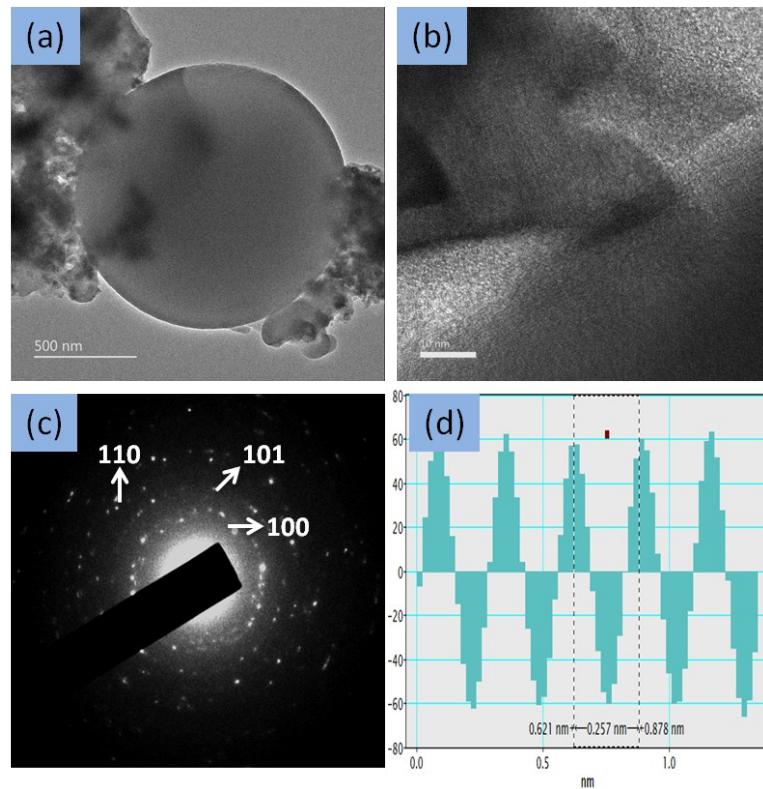


Fig. S2 (a) TEM image, (b) HRTEM image, (c) SAED pattern and (d) Lattice spacing of **ZnO-1**.

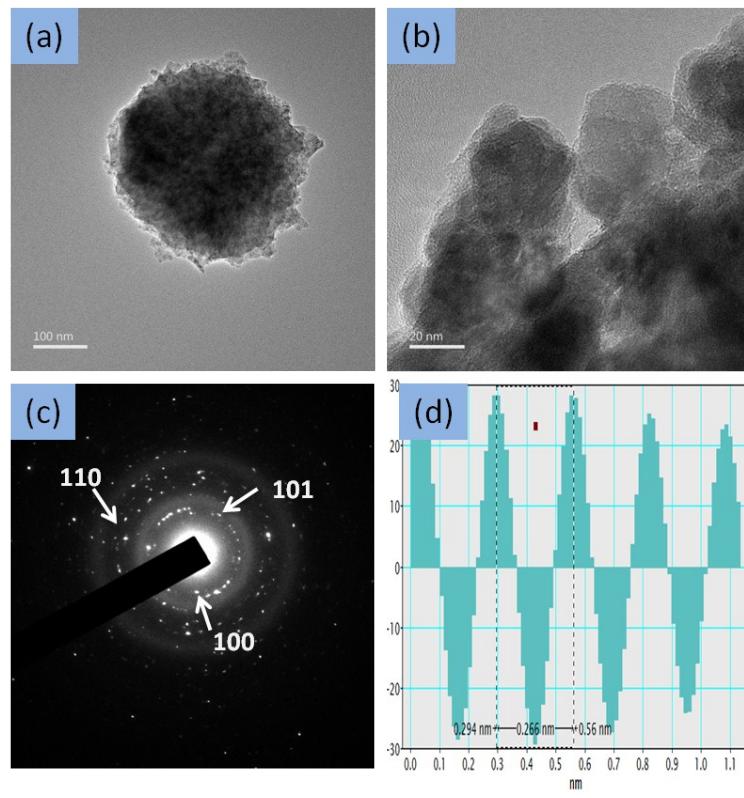


Fig. S3 (a) TEM image, (b) HRTEM image, (c) SAED pattern and (d) Lattice spacing of **ZnO-5**.

Section-S5: Tauc Plots of as-synthesised ZnO nanostructures

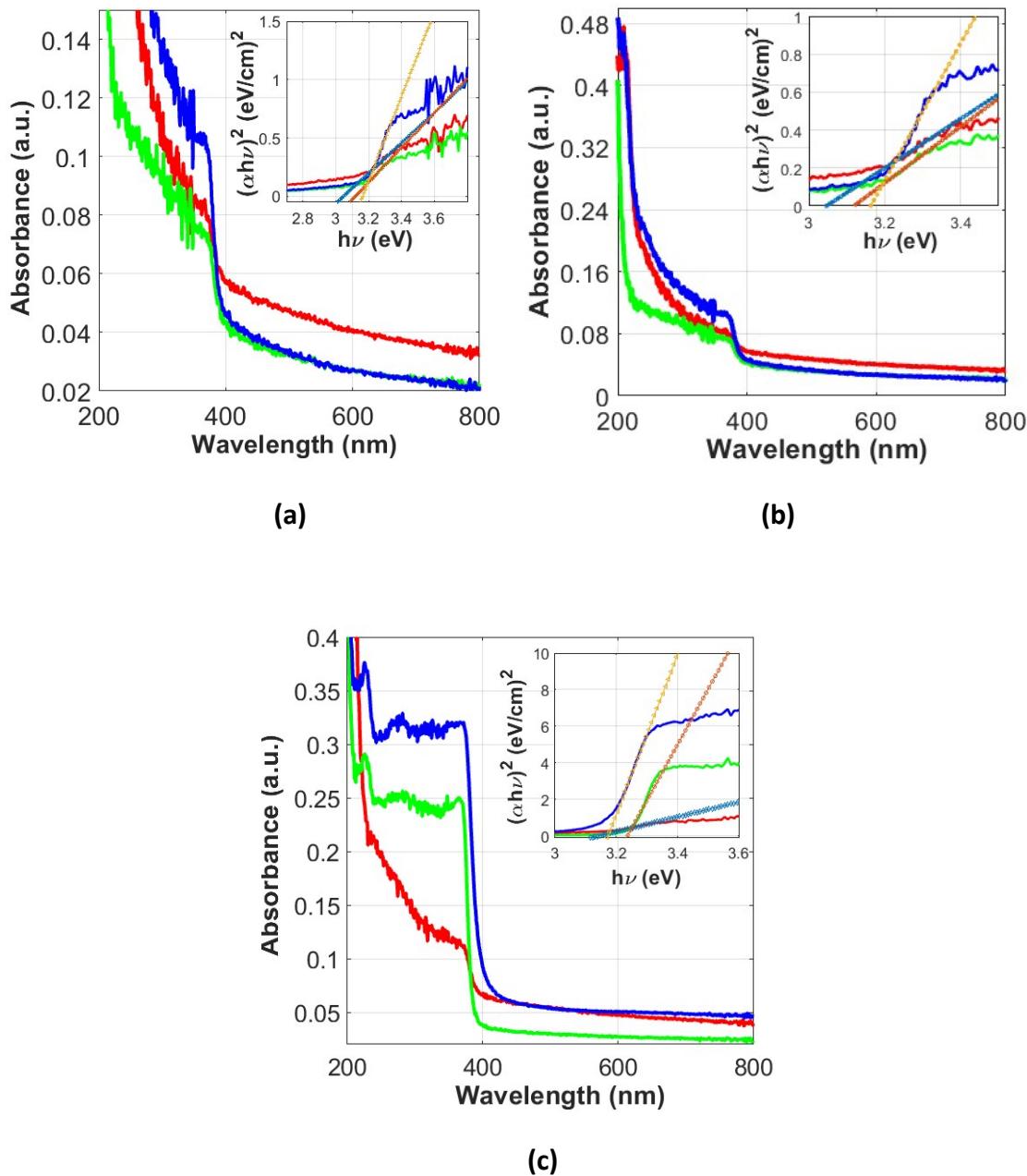


Fig. S4 UV-vis absorption spectra of (a) ZnO-1 to ZnO-3, (b) ZnO-4 to ZnO-6, and (c) ZnO-7 to ZnO-9 {(volume = 1 mL (red), volume = 2 mL (green), volume = 3 mL (blue)} with each inset is a plot of $(\alpha h\nu)^2$ versus $(h\nu)$.

Section-S6: Band gap values of as-synthesised ZnO nanostructures**Table S2.** Band gap values of as-grown ZnO nanostructures.

Sample	Band Gap (E_g)
ZnO-1	3.18
ZnO-2	3.24
ZnO-3	3.20
ZnO-4	3.12
ZnO-5	3.23
ZnO-6	3.18
ZnO-7	3.01
ZnO-8	3.15
ZnO-9	3.09