Electronic Supplementary Material (ESI) for RSC Advances.

Supplementary Information

Water–based synthesis and cleaning methods for high purity ZnO nanoparticles – comparing acetate, chloride, sulphate and nitrate zinc salt precursors

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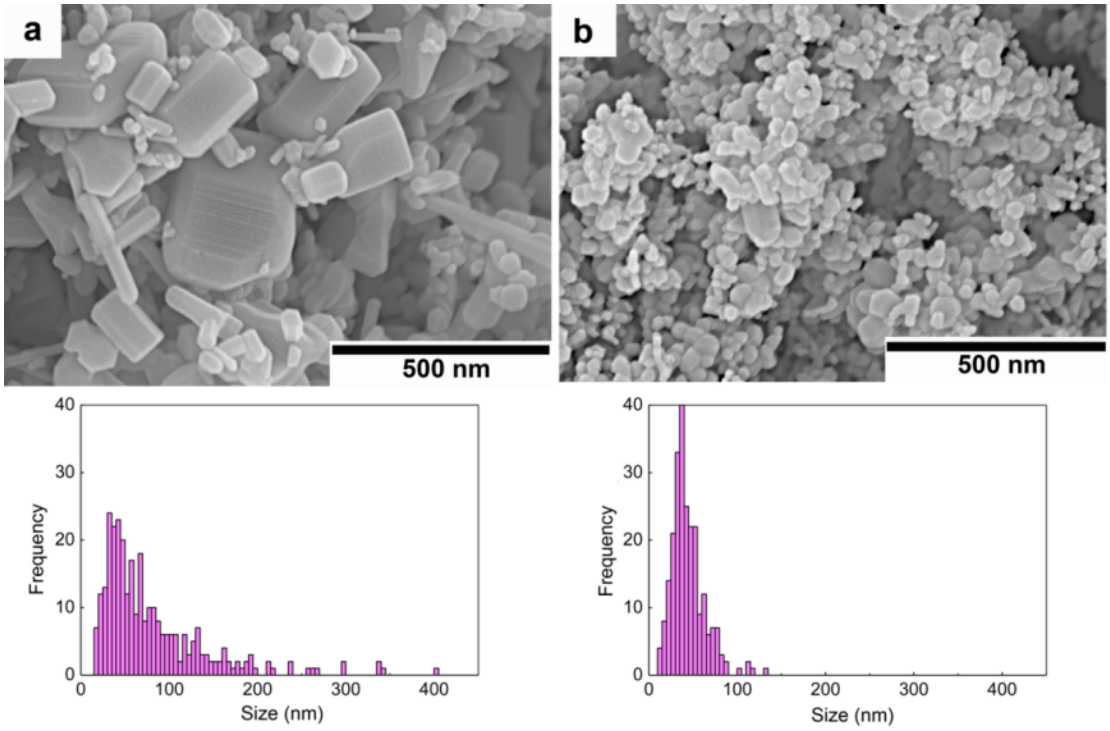

Fig. S1 Scanning Electron micrographs and size distributions (counting number = 250) of commercial ZnO particles a) NanoTek b) MKnano

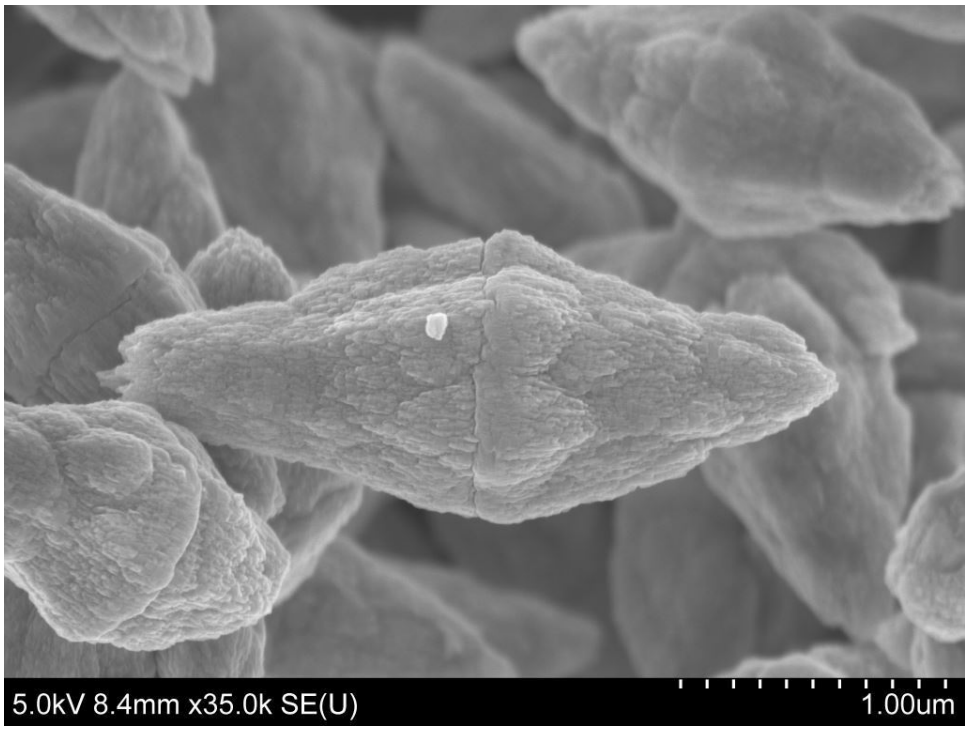

Fig S2. Scanning Electron micrograph of octahedron ZnO particles showing twin petals. The polygons (twin petals) were synthesized under stoichiometric conditions using the zinc nitrate salt at reaction yield 4g/L (60°C).

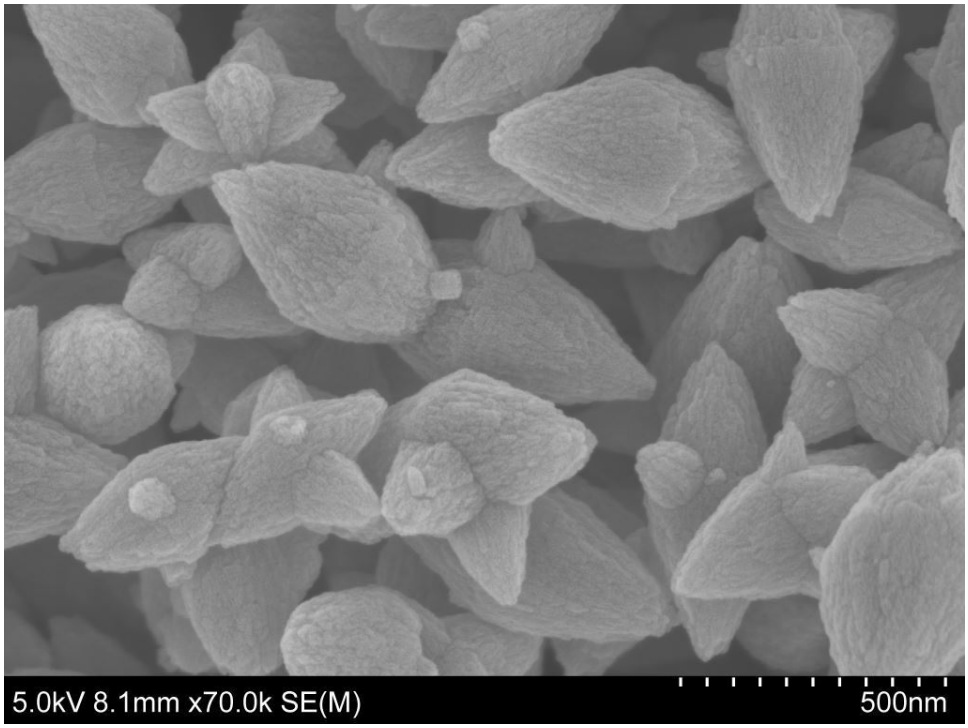

Fig S3. Scanning Electron micrograph of ZnO particles showing intermediate early steps in the formation of flower-shaped particles by growing spikes on the octahedron polygones. The particles were synthesized under stoichiometric conditions using the zinc nitrate salt at reaction yield 4g/L (80°C).

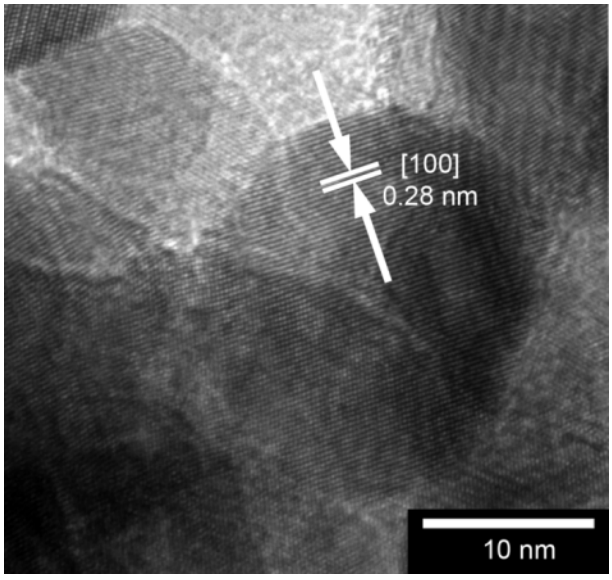

Fig S4. High-resolution transmission electron micrograph of ZnO particles showing the basal plane of prism with an inter-planar distance of 0.28 nm.

Video 1

Video 1. Transformation of facetted salt entities from ion suspension of nitrate-containing precipitation medium.

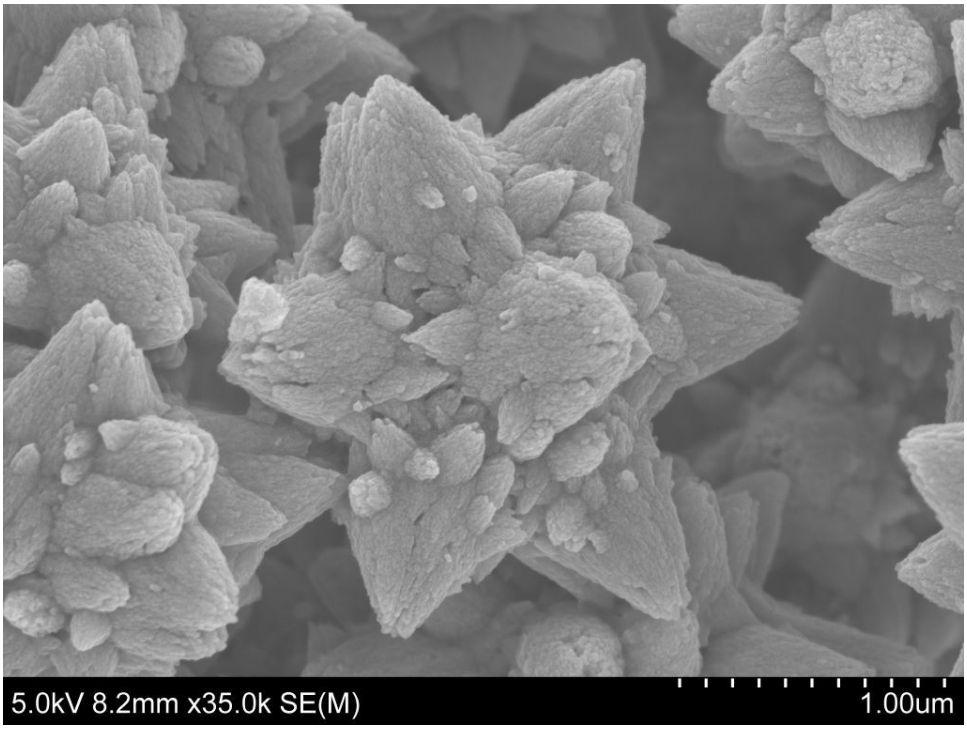

Fig S5. Scanning Electron micrograph of ZnO particles showing more extensive formation of larger flower-shaped particles by reducing the concentration of precursors and reducing the influence of nitrate counter-ions on material migration during synthesis.

Video 2

Video 2. Evaporation characteristics of sulphate ion containing supernatant on TEM grid in the vicinity of ca. 150 particles. Note the adsorption of the salt residuals to the surfaces of the particles.

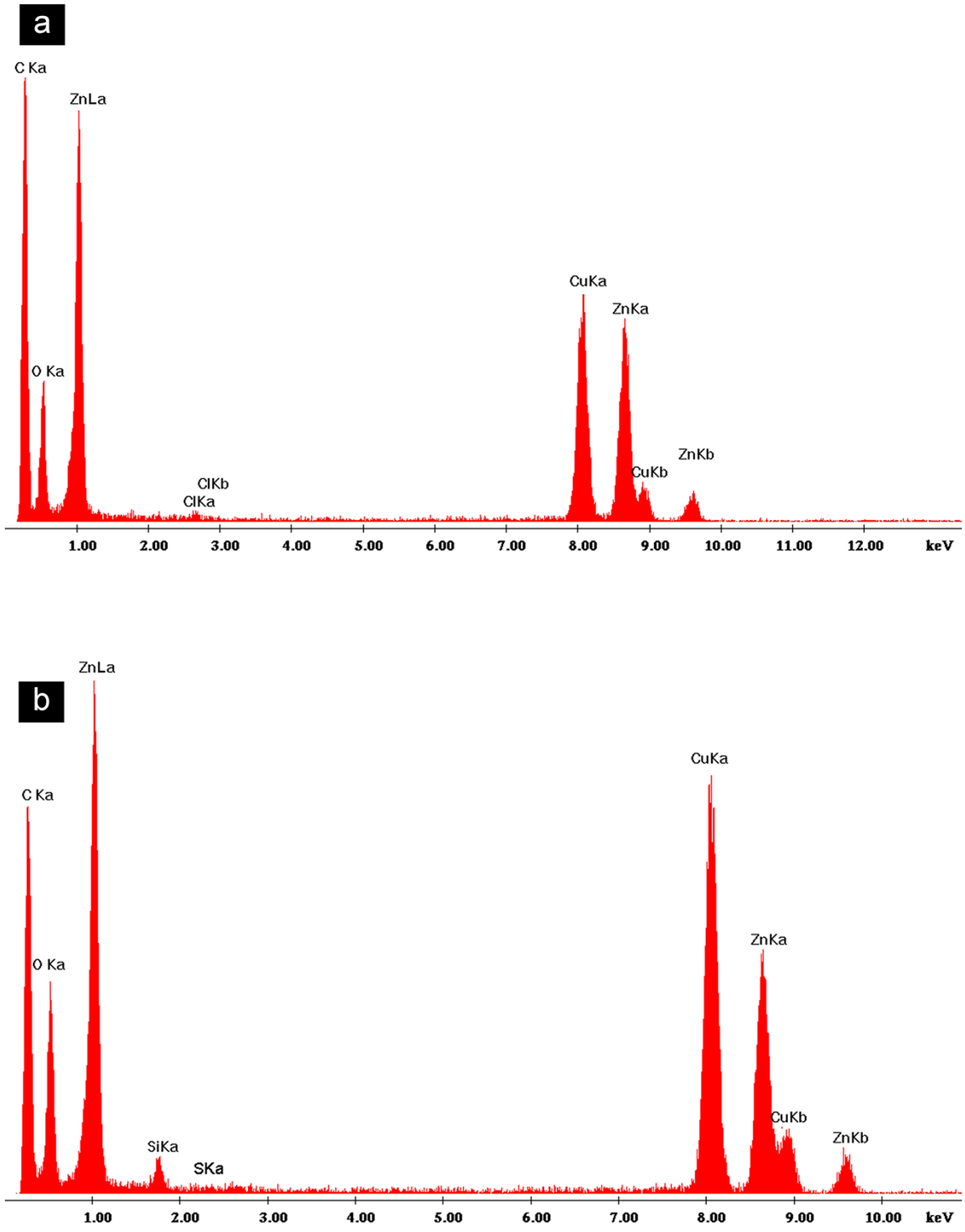

Fig S6. EDX spectra for chloride- and sulphate-derived ZnO nanoparticles a)ZC-8g b)ZS-8g after UC cleaning. These examples were chosen to emphasize the absence of counter-ions traces on the particle surfaces. The EDX characterization of acetate-derived particles showed no counter-ion removal efficiency because carbon in the acetate group was interfering with carbon from the TEM grid.