Electronic Supplementary Material (ESI) for CrystEngComm

Supporting Information

Self-assembly of [10$\bar{1}$0] grown ZnO nanowhiskers with exposed reactive (0001) facets on hollow spheres and their enhanced gas sensitivity

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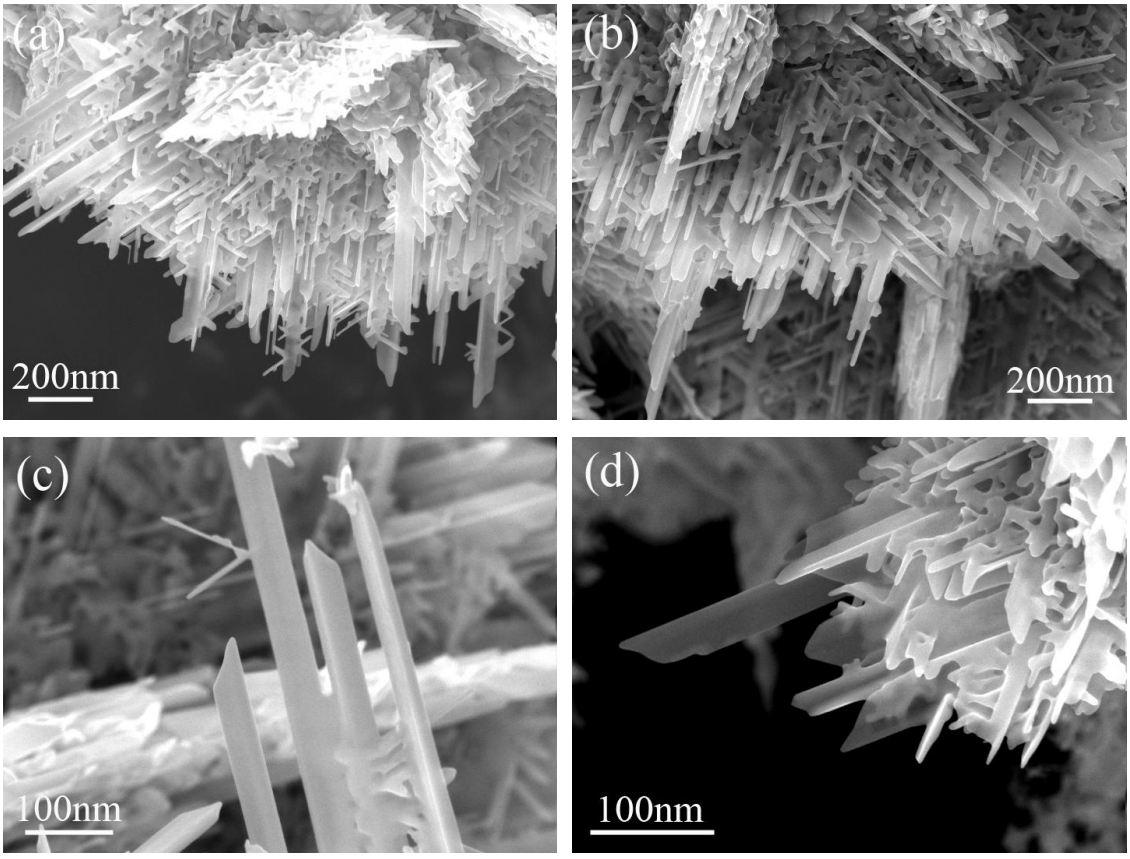
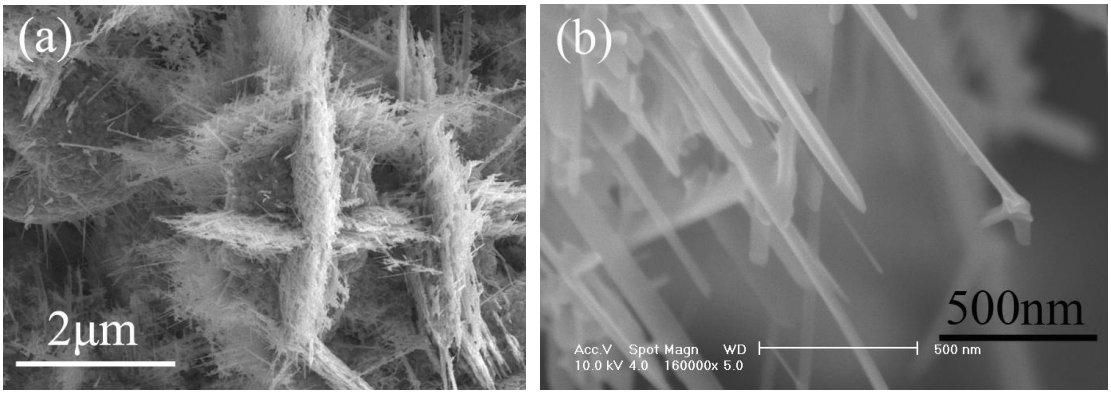
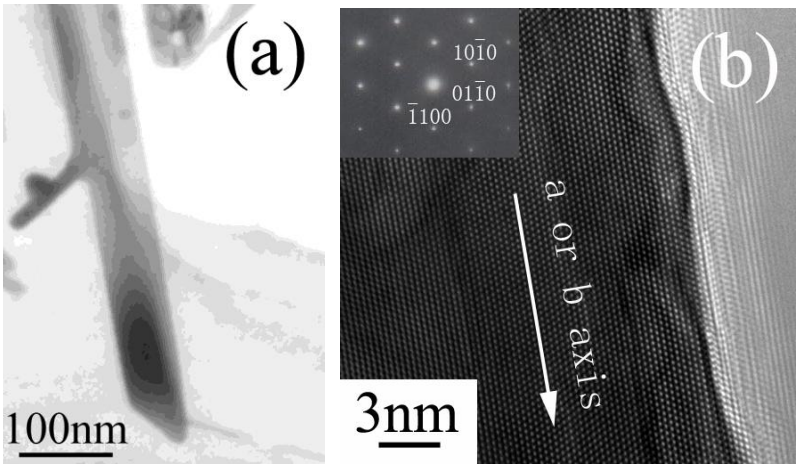


SI-1. SEM images of the Zn products annealed for more than 24 hours: (a), (b) top-view of an as-synthesized ZnO hierarchical nanostructure; (c), (d) side view of enlarged ZnO nanowhiskers of a hierarchical nanostructure.



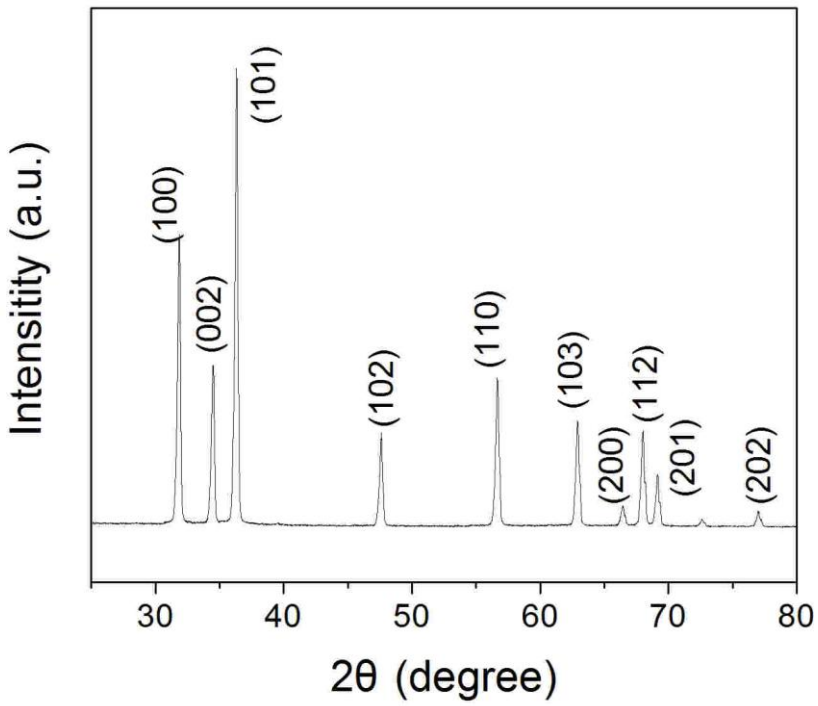
SI-2. SEM images of the Zn products annealed for more than 24 hours: (a) side-view of an as-synthesized ZnO hierarchical nanostructure and (b) side view of enlarged ZnO nanowhiskers of a hierarchical nanostructure.



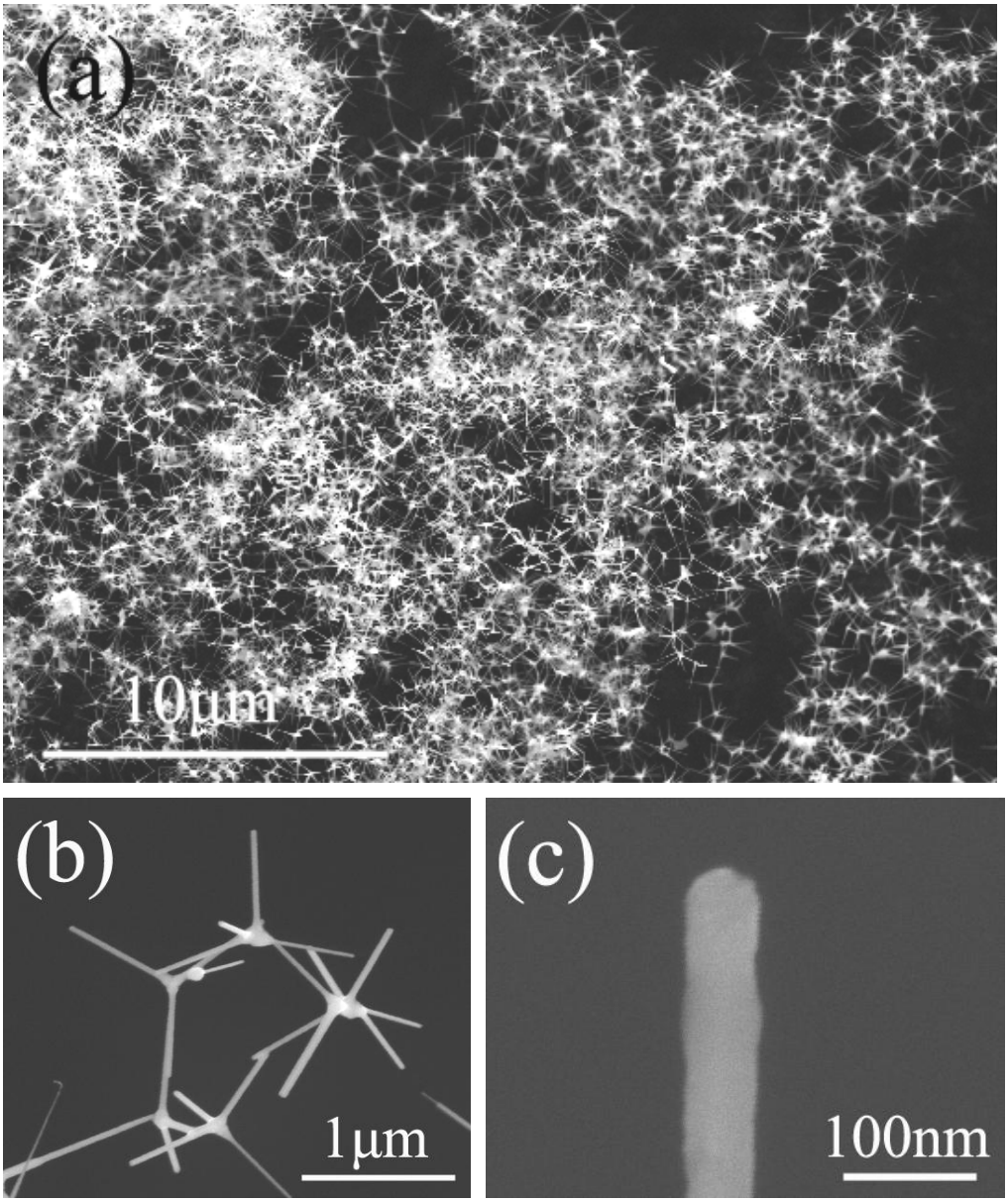
SI-3. TEM image of a nanowhisker; (b) HRTEM image of this nanowhisker and in situ electron diffraction pattern (inset) show that the nanowhisker is a single crystal and grows along the *a* or *b* axis, not the typical *c* axis.

Experimental details for synthesis of ZnO nanobranches

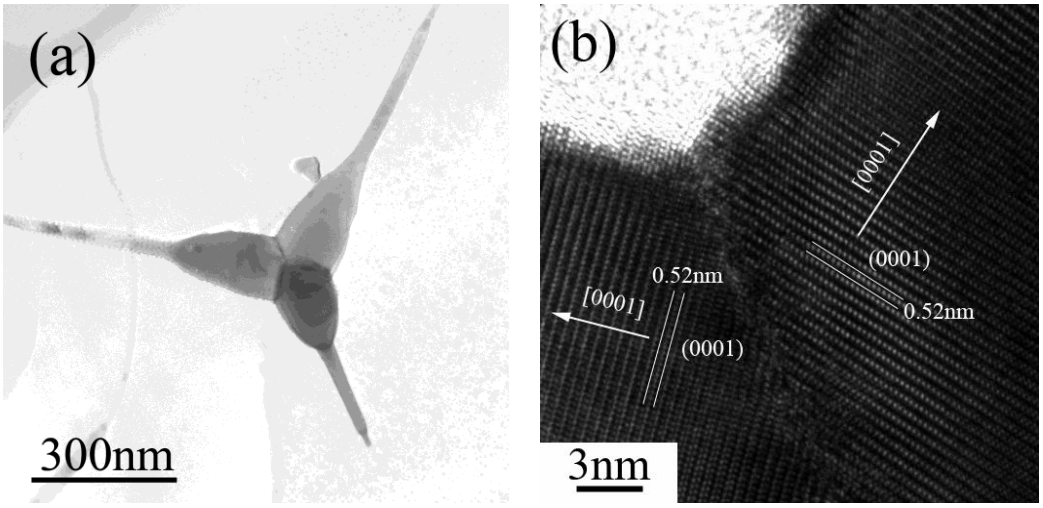
ZnO nanobranches with typical [0001] grown nanowires were synthesized by a simple vapor-solid route. An alumina boat with pure Zn powders (1-2 g, 200 meshes) was placed in the front of an alumina hollow tube 25 mm in inner diameter and 22 cm in length. The alumina hollow tube together with the alumina boat was placed in the middle of a horizontal quartz tube furnace. The quartz tube was pumped and then filled with argon and re-pumped. After repeating the operation three times, the quartz tube was full of argon atmosphere. Then, the quartz tube was heated to 700℃ in one hour under an argon flow of 20 standard cubic centimeters per minute (sccm). After the temperature reached 700℃, a sparse oxygen flow of 1 sccm with argon flow of 80 sccm was suddenly introduced into the quartz tube to react with the Zn vapor for half an hour. Finally, the oxygen flow was turned off and the furnace was naturally cooled.



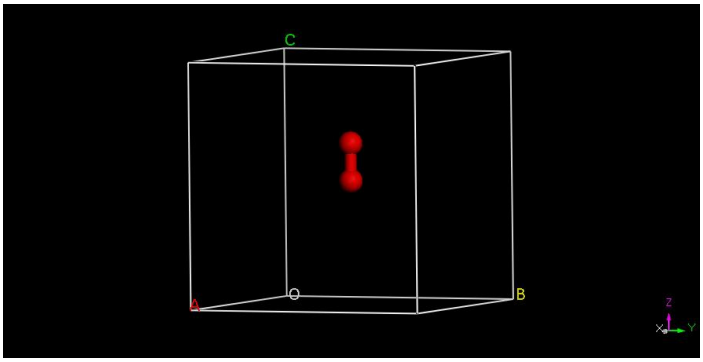
SI-4. X-ray diffraction pattern (XRD) of the product shows that the product is ZnO in the hexagonal wurtzite structure.



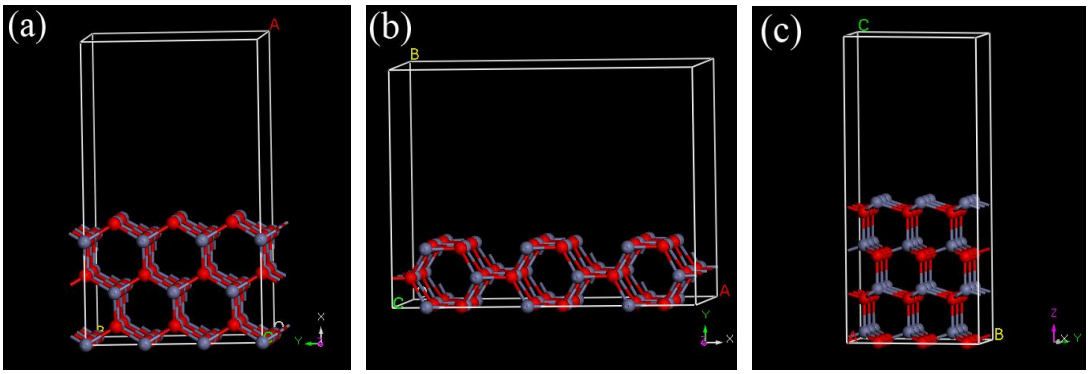
SI-5. SEM images of ZnO nanobranches at different magnifications.



SI-6. TEM (a) and HRTEM (b) images of a single ZnO nanobranch show that the individual nanowires of a branch grow along the [0001] direction.



SI-7. Structural model of an oxygen molecule.



SI-8. Slab models of ZnO $(10\bar{1}0)$ (a), $(10\bar{1}1)$ (b), and (0001) (c) surfaces.