

Supplementary Information

Crystal Plane Dependence of Critical Concentration for Nucleation on Hydrothermal ZnO Nanowires

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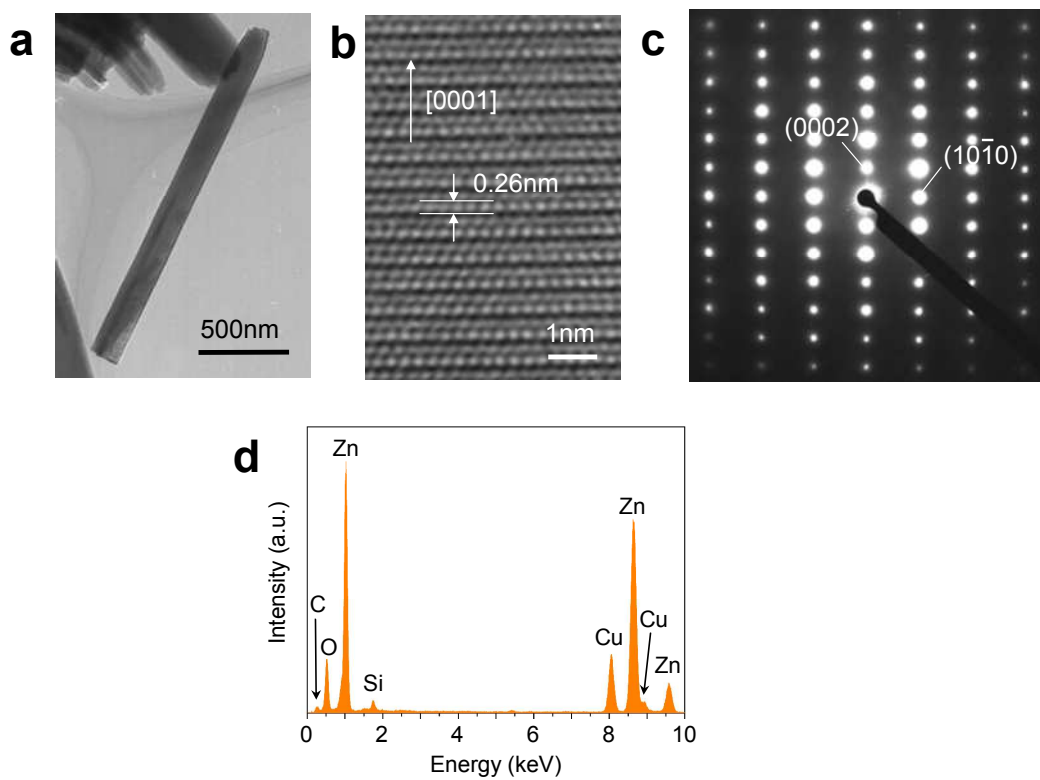


Figure S1. (a) Low magnification TEM image of ZnO nanowire. (b) High magnification TEM image of ZnO nanowire and (c) selected area electron diffraction (SAED) pattern, indicating the [0001] growth orientation. (d) EDS pattern of ZnO nanowire.

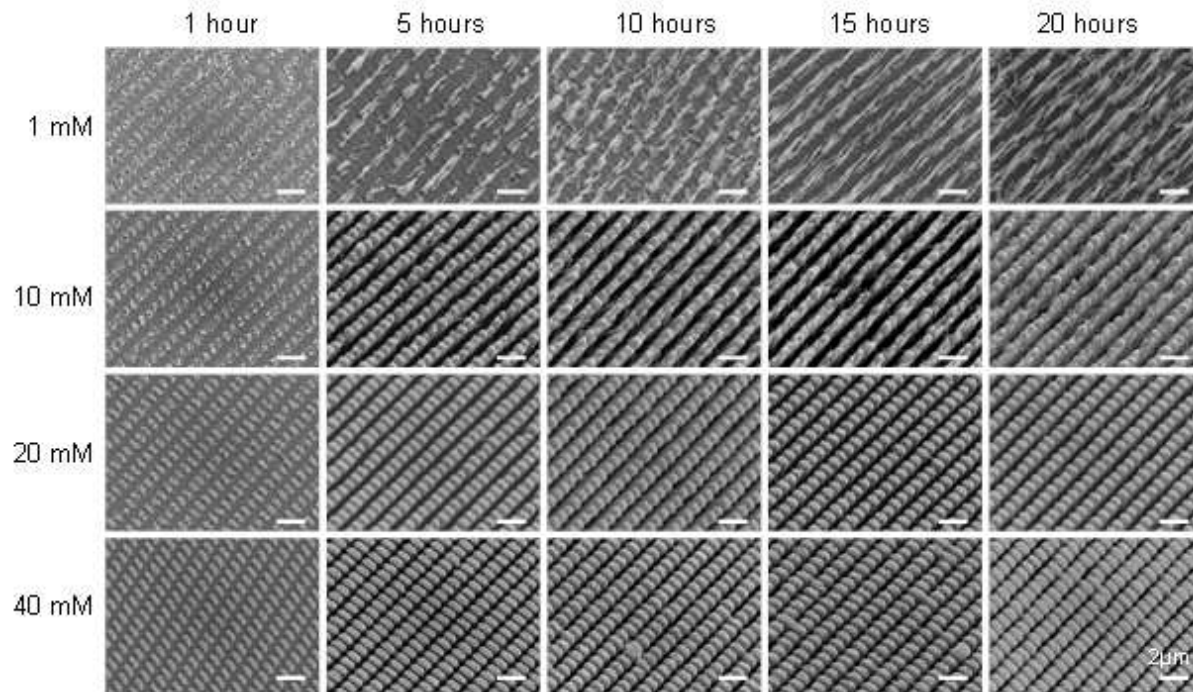


Figure S2. Time series SEM images of morphology change of nanowires when varying a concentration ranged from 1 mM to 40 mM.

Clearly, for relatively low concentration-1mM, the nanowires grow only along $\langle 0001 \rangle$ direction and the aspect ratio increases with increasing the reaction time. On the other hand, for relatively high concentration range above 20mM, the nanowires grow not only $\langle 0001 \rangle$ direction but also the lateral direction even at quite early stage of growth-1 hour. These images clearly highlight that there is a significant effect of concentration on the growth direction.

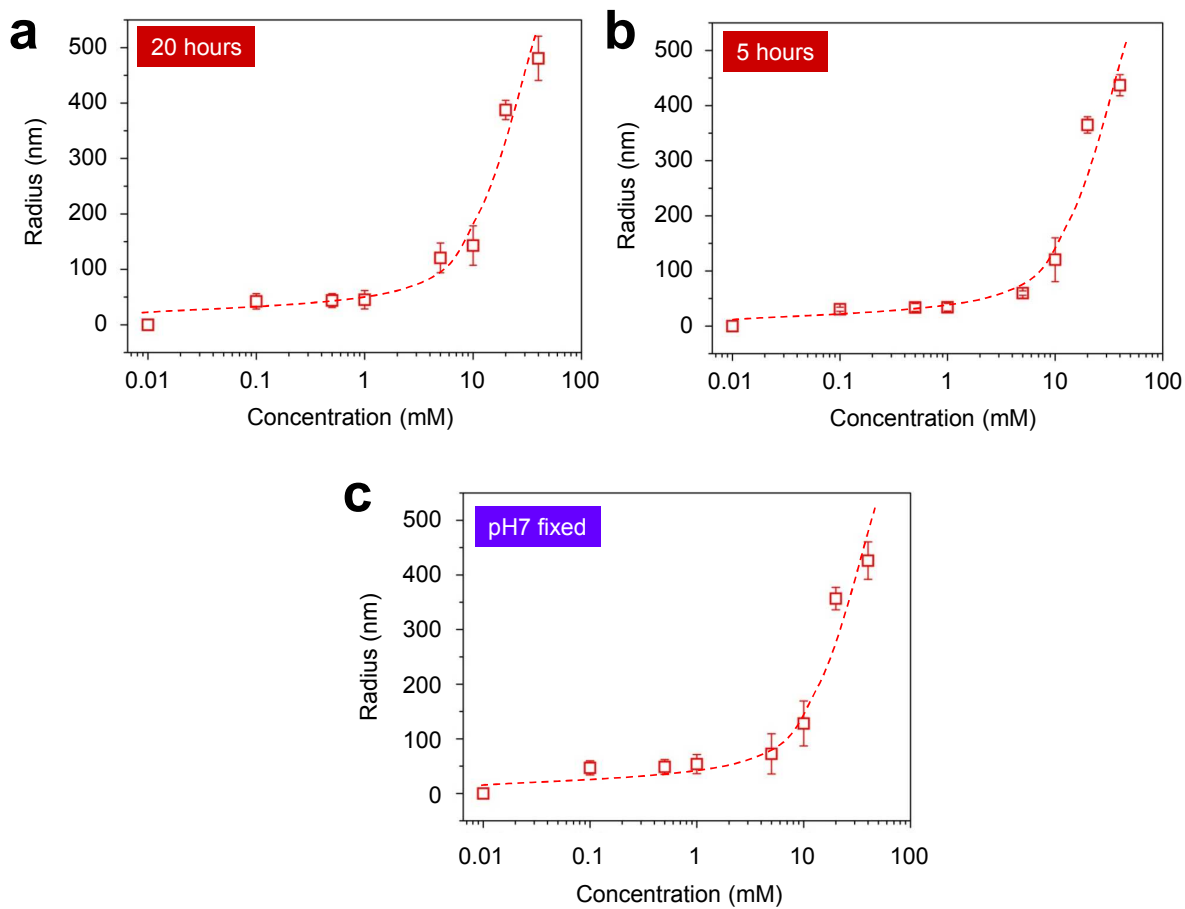


Figure S3. Magnified data of the concentration dependence on the radius data. (a) the data at 20 hours of reaction time, (b) the data at 5 hours of reaction time, (c) the data at 20 hours of reaction time in constant pH controlled experiments.

These magnified data clearly show that the increase of radius of nanowires start around above 1mM.

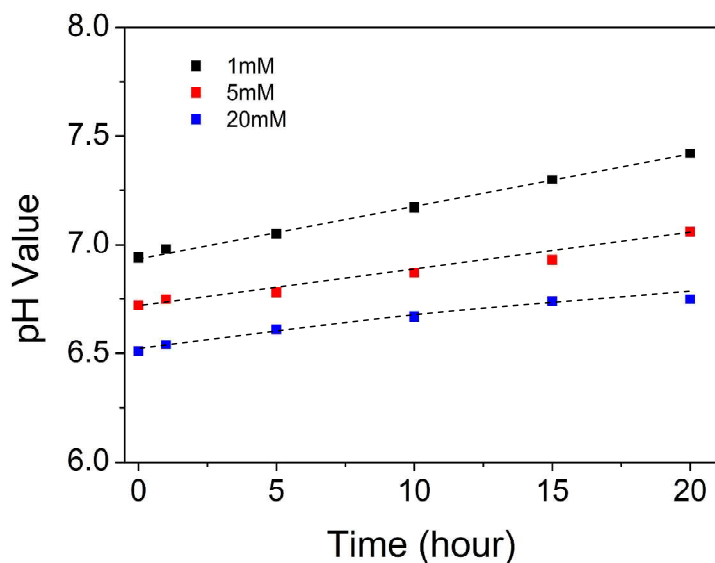


Figure S4. pH value change as a function of nanowire growth time.

The slight increases of pH value are observed for all concentrations. This trend can be interpreted in the release of hydroxyl ions from HMTA during the reaction. The change of pH value for 20 hours was just 0.24 even for 20 mM. Obviously the pH variation ranges are quite small, and such pH variation does not seem to impact the reaction scheme of ZnO hydrothermal synthesis as reported in previous works.