Electronic Supplementary Material (ESI) for RSC Advances.

Electronic Supplementary

Nanoporous ZnO nanostructure synthesis by a facile method for superior sensitive ethanol sensor applications

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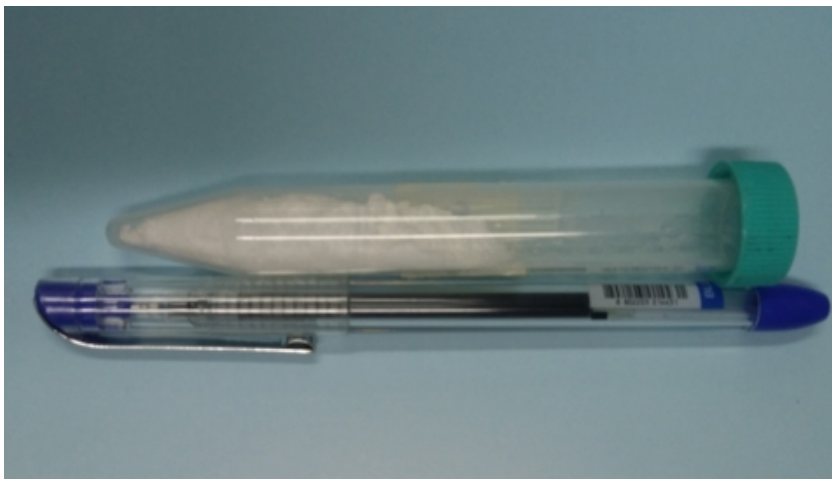
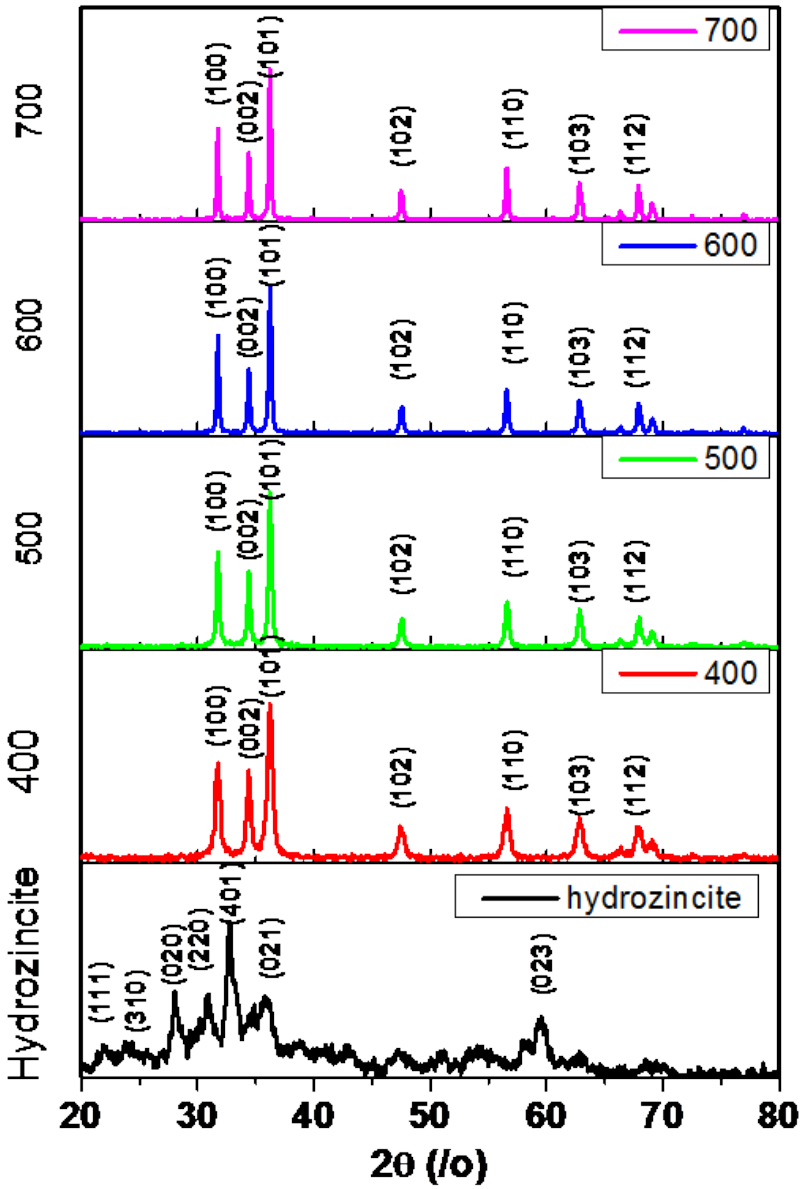
Figure S 1. A photo of precipitated product, and details about the calculation of the yield of material.



- Chemical reaction: $5Zn(NO_3)_2 + 2Na_2CO_3 + 6H_2O = C_2H_6O_{12}Zn_5 + 4NaNO_3 + 6HNO_3$
- Mol of zinc nitrate, $Zn(NO_3)_2$ used in this work (50 ml, 1M) → n_{Zn2+}*=50 mmol*.
- Mol of sodium carbonate, Na_2CO_3 used in this work (10 mL of 1 M) → n_{Na2CO3}*= 10 mmol*.
- If essumed that 100% zinc nitrate was trasfered into Hydrozincite → mol of hydrozincite: n=50/5=10 mmol → Weight of Hydrozincite (M=548.96 g/mol) theoretically calculated based on zinc nitrate used: m=10 × 548.96 (mg)= 5489.6 mg=5.489 g
- However, the amount of Na_2CO_3 used in this work is much less than the requirement amount for the reaction, thus the $Zn(NO_3)_2$ remains in the reaction. Therefore, we calculated the yield of Hydrozincite over the sodium carbonate . With assumsion that 100% of Na_2CO_3 was reacted, thus weight of Hydrozincite theoretically calculated based on sodium carbonate used is: m= 5× 548.96 (mg)=**2.74 g**
- Weight of Hydrozincite obtained in our experiment: ~2.6 g
- Yield of over the is =2.6/2.74 ≈ 94% of sodium carbonate used.

Figure S2. XRD patterns of the ZnO nanostructures calcinated at 400, 500, 600, and 700°C



The average crystalline size calculated by Scherrer equation using the (101) peak is 16.1, 25.1, 31.0, and 35.9 nm, respectively.

Figure S3. SEM images of ZnO heat treated at different temperatures: (A) 400, (B) 500, (C) 600, and (D) 700^{o}C

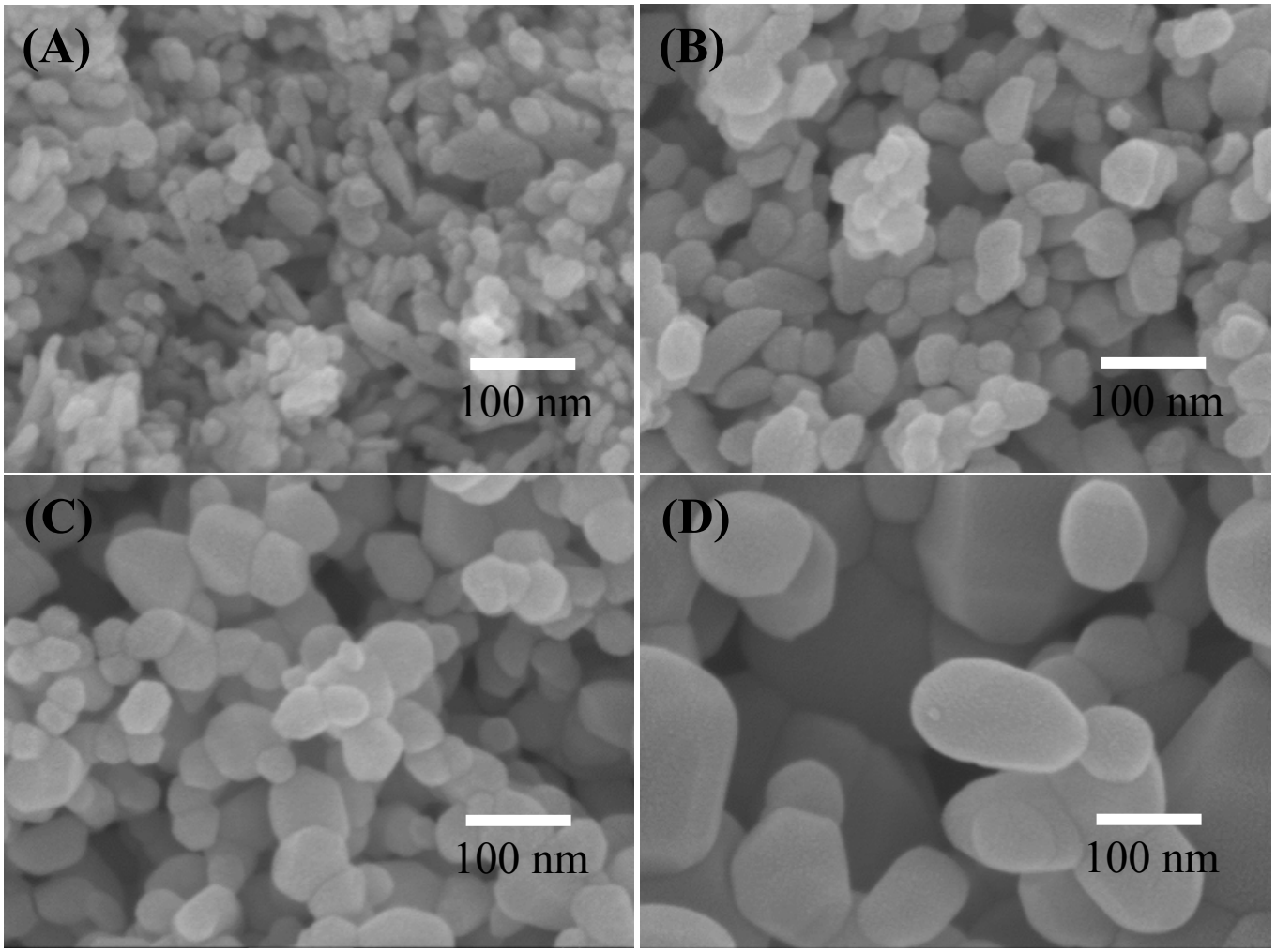


Figure S4. (A) Nitrogen adsorption/desorption isotherm of the ZnO nanostructures calcinated at 400°C; and (B) pore size distribution