Supplementary Information

Novel BN porous-hollow nanorods: synthesis, tunable dimensions, properties and formation mechanism

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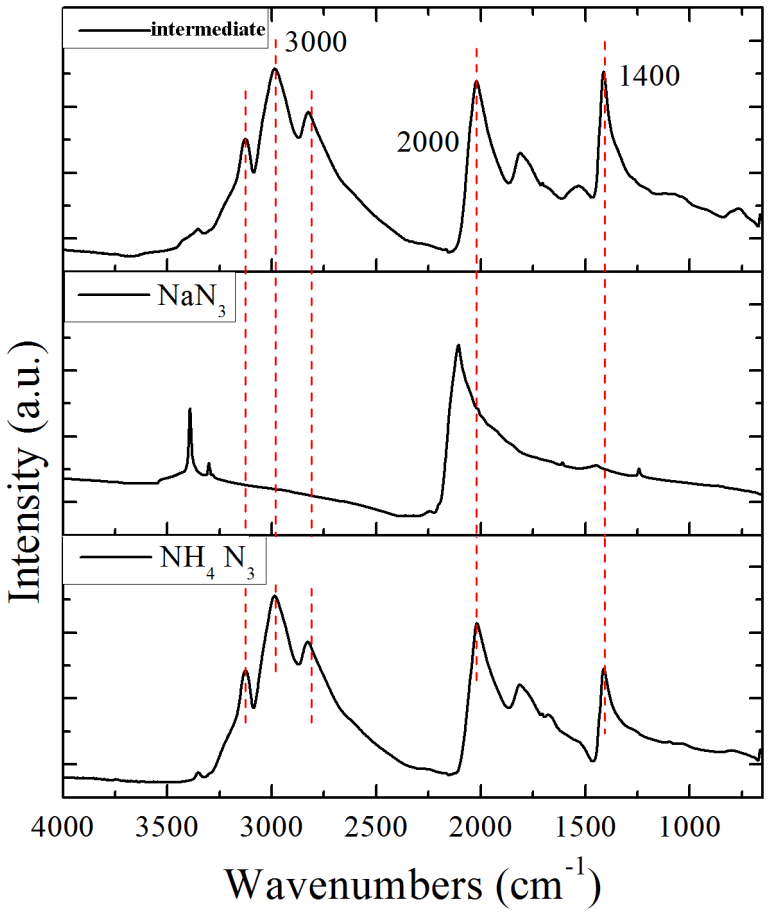

Figure S1 The FTIR spectra of synthesized NH_4N_3 following the reference [S1], NaN_3 and intermediate obained on the wall of the telfon tube when reaction temperature being 190 ℃. At lower temperature, the NH_4BF_4 and NaN_3 firstly reacted with each other to form NH_4N_3 and $NaBF_4$. Because the synthesis rate of BN at lower temperature was very slow. So, the formed gaseous NH_4N_3 would easily diffuse to the liquid medium and crystallize on the wall of telfon tube in the cooling process. However, the other intermediate of $NaBF_4$ was on the bottom of tube. The self-separation phenomenon of this two intermediates also help us investigate the composition.

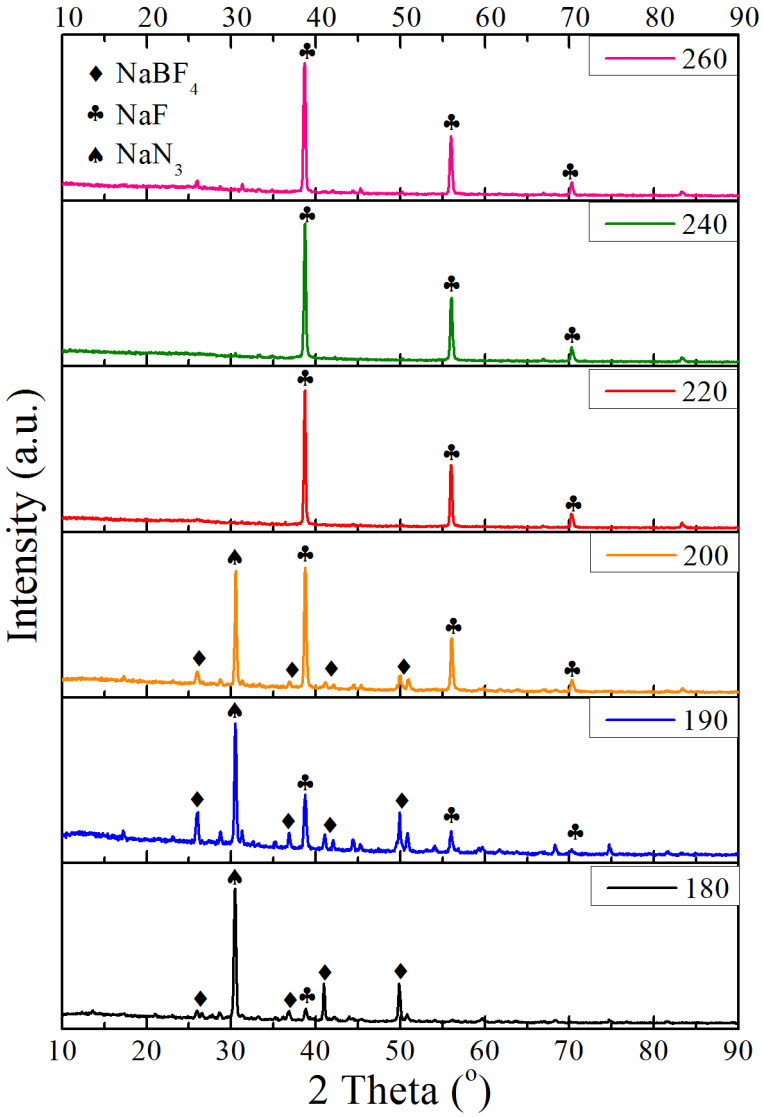

Figure S2 The XRD patterns of untreated solid powders after reaction at 180~260 ℃ collected on the bottom of telfon tube. It is shown that when reaction temperature was lower than 200 ℃, the intermediate of $NaBF_4$ firstly generated. Then it would decomposite into NaF when reacting with NH_4N_3 to form BN.

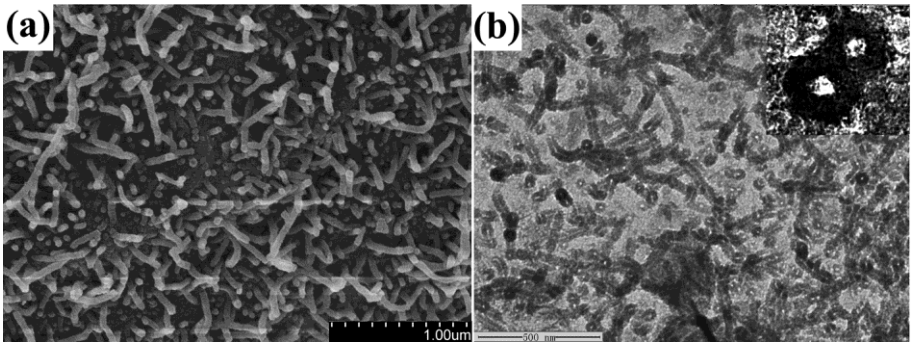

Figure S3 (a) TEM and (b) SEM images of BN porous-hollow nanorods obtained at 280 ℃&150 MPa for 6 h. The insert is high magnification TEM image of nanorod heads. Obvious hollow structure has formed at shorter time.

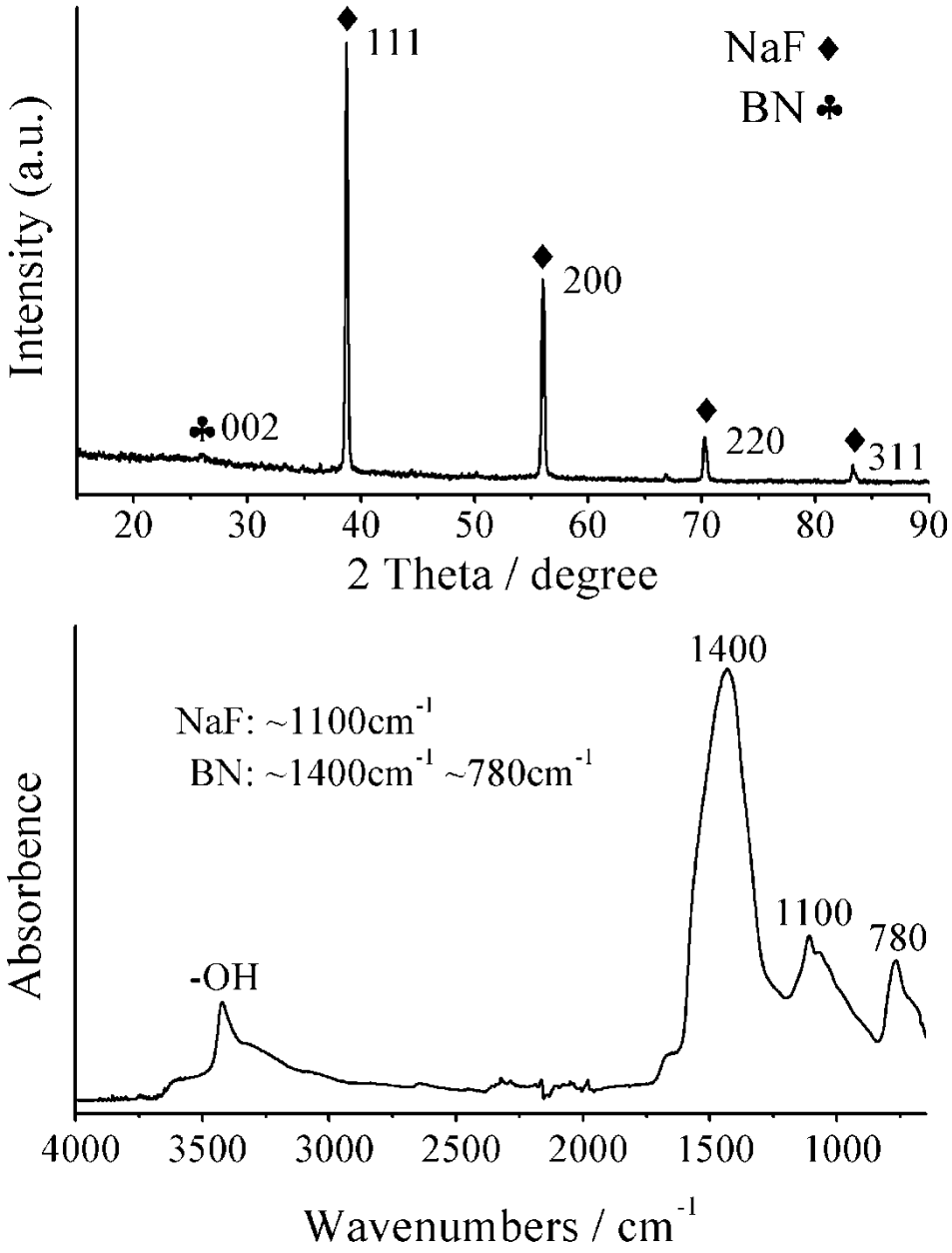

Figure S4 (a) XRD pattern and FTIR spectrum of untreated product after reaction.

Supporting Information References

S1. B.L. Evans, A.D. Yoffe, P. Gray, Chem. Rev., 1959, 59, 515.