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 NH₄N₃ following the reference[S1], NaN₃ and intermediate obtained on the wall of the teflon tube when reaction temperature being 190 °C. At lower temperature, the NH₄BF₄ and NaN₃ firstly reacted with each other to form NH₄N₃ and NaBF₄. Because the synthesis rate of BN at lower temperature was very slow. So, the formed gaseous NH₄N₃ would easily diffuse to the liquid medium and crystallize on the wall of teflon tube in the cooling process. However, the other intermediate of NaBF₄ 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 °C collected on the bottom of teflon tube. It is shown that when reaction temperature was lower than 200 °C, the intermediate of NaBF$_4$ firstly generated. Then it would decomposite into NaF when reacting with NH$_4$N$_3$ to form BN.

**Figure S3** (a) TEM and (b) SEM images of BN porous-hollow nanorods obtained at 280 °C&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