

Electronic Supplementary Information

# **Aminopolymer Functionalization of Boron Nitride Nanosheets for Highly Efficient Capture of Carbon Dioxide**

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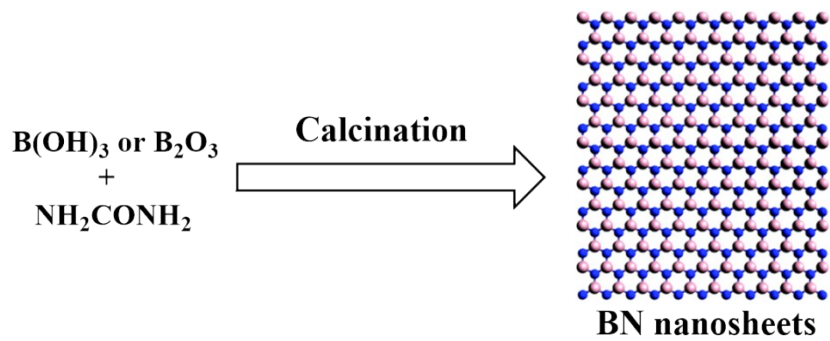


Fig. S1 Synthetic route for BN nanosheets.

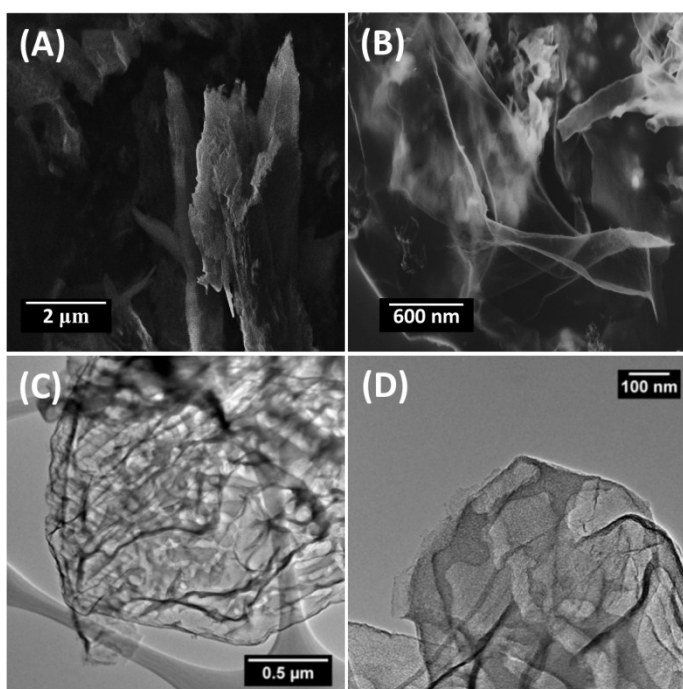
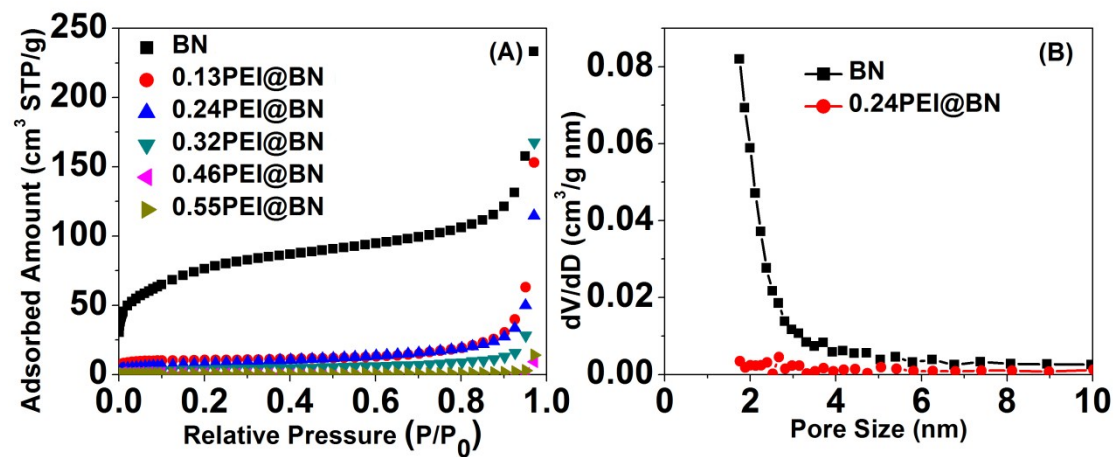
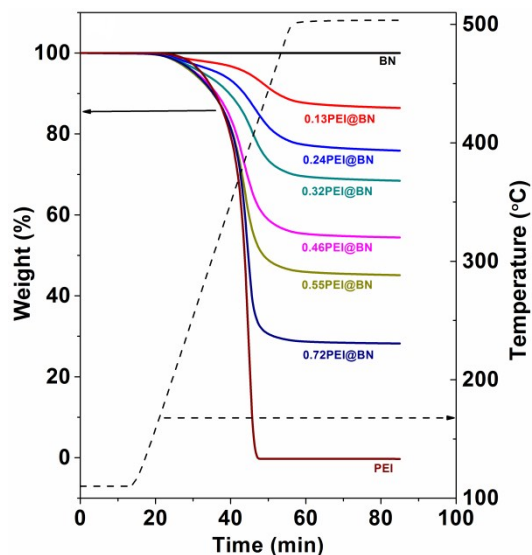


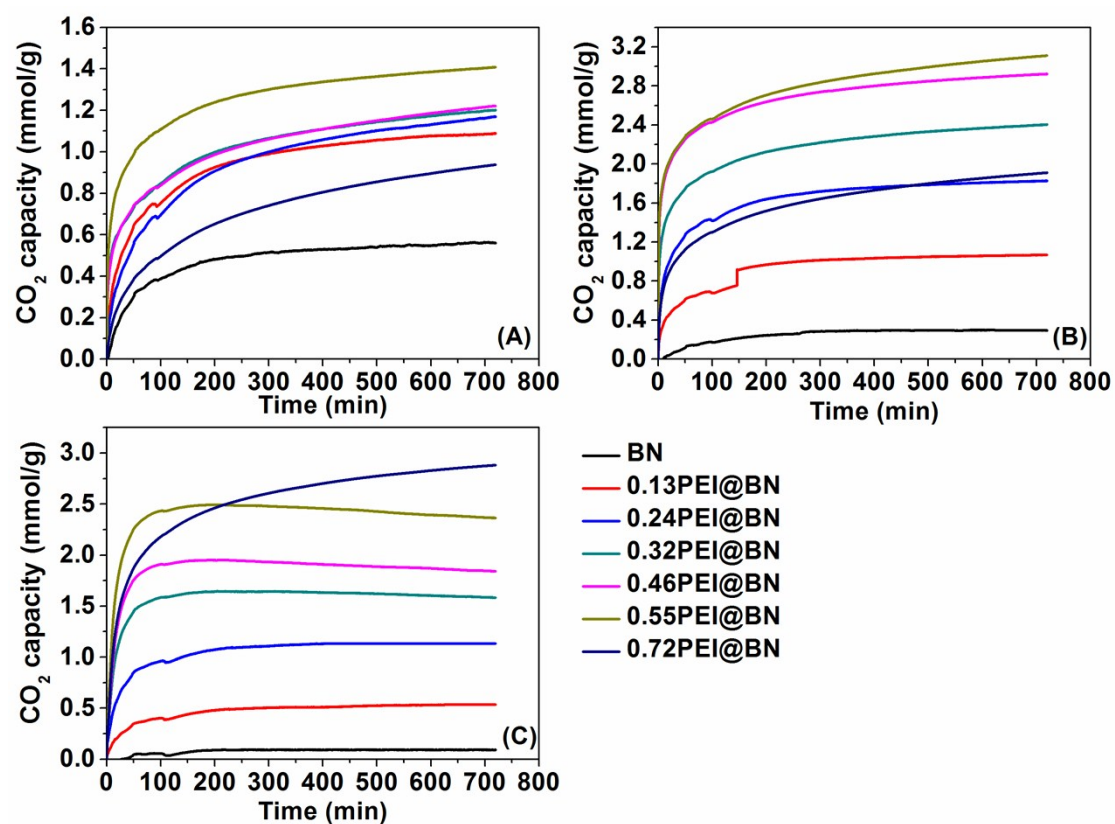
Fig. S2 SEM (A,B) and TEM (C,D) images of BN.



**Fig. S3** N<sub>2</sub> adsorption isotherms at -196 °C (A) and BJH pore size distributions (B) of BN and PEI@BN samples.



**Fig. S4** TG profiles of PEI, BN and PEI@BN samples.

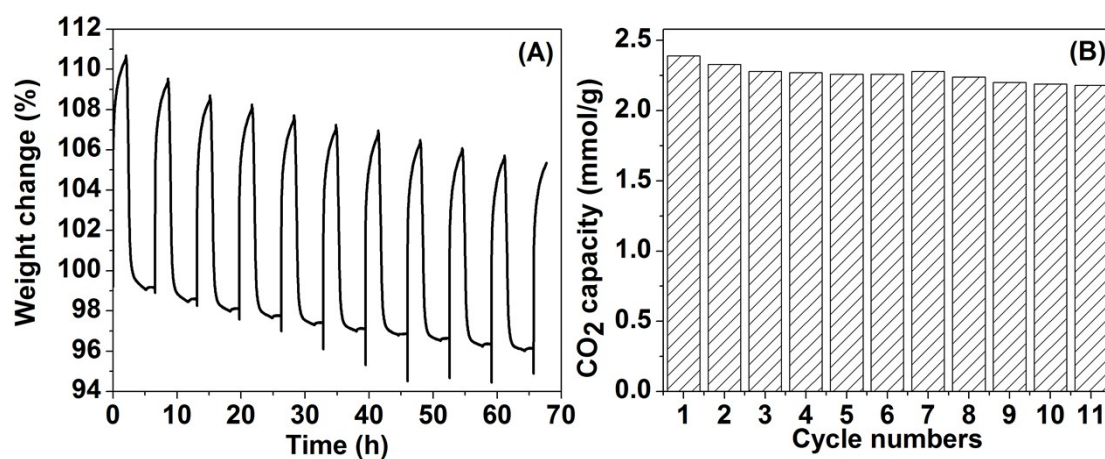


**Fig. S5** TG profiles of CO<sub>2</sub> adsorption on BN and PEI@BN samples at 30 °C (A), 75 °C (B) and 120 °C (C) (conditions: pure CO<sub>2</sub>, 50 mL/min, 12 h).

**Table S1.** Comparison of BN with mesoporous silicas for aminopolymer functionalizaion

| Adsorbents                 | PEI loading (wt. %) | $S_{\text{BET}}^{\text{a}}$ ( $\text{m}^2/\text{g}$ ) | $V_{\text{t}}^{\text{b}}$ ( $\text{cm}^3/\text{g}$ ) | $\text{CO}_2$ capacity <sup>c</sup> ( $\text{mmol}/\text{g}$ ) |
|----------------------------|---------------------|---|--|--|
| BN                         | -                   | 280   | 0.24   | -  |
| 0.55PEI@BN                 | 54.9                | 3   | 0.01   | 3.12   |
| SBA-15 <sup>d</sup>        | -                   | 753   | 0.94   | -  |
| 0.5PEI@SBA-15 <sup>d</sup> | ~50                 | 13  | 0.04   | 2.89   |
| MCM-41 <sup>d</sup>        | -                   | 1042  | 0.85   | -  |
| 0.5PEI@MCM-41 <sup>d</sup> | ~50                 | 4   | 0.01   | 2.52   |
| KIT-6 <sup>d</sup>         | -                   | 895   | 1.22   | -  |
| 0.5PEI@KIT-6 <sup>d</sup>  | ~50                 | 86  | 0.18   | 3.07   |

a: BET surface area; b: total pore volume; c: determined at 75 °C; d: cited from reference 33.



**Fig. S6.** Recycle 0.55PEI@BN at 110 °C (A: TG profiles, B: CO<sub>2</sub> capacities)