

## Supplementary Information

Production of high quality single- or few-layered graphene by solid exfoliation of graphite in presence  
of ammonia borane

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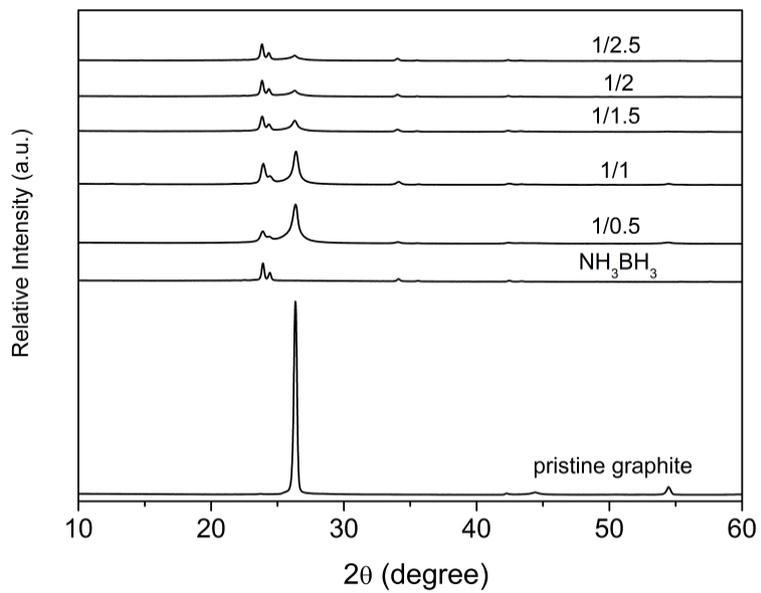
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## Experimental Section

Graphene sheets were prepared from naturally crystalline graphite flakes using a ball milling method. In a typical experiment, 0.3 g mixtures of graphite powder (99.9%) and  $\text{NH}_3\text{BH}_3$  (97%, Sigma-Aldrich) with different graphite/ $\text{NH}_3\text{BH}_3$  weight ratios were mechanically milled under argon atmosphere using a Retsch PM400 planetary ball mill. All the manipulations are conducted inside a glove box filled with purified argon. The ball milling was carried out at a milling rate of 150 rpm for 0.5-4 hours with 10 steel balls (6 of 1.0 cm in diameter and 4 of 1.3 cm in diameter) at room temperature. The milled products were washed with ethanol to remove  $\text{NH}_3\text{BH}_3$  from the milled samples.

X-ray diffraction (XRD) patterns were recorded on an X'Pert Pro (PANAnalytical) diffractometer with  $\text{Cu K}\alpha$  radiation at 40 kV and 40 mA.  $\text{N}_2$  adsorption/desorption experiments were undertaken isothermally at 77 K on Quanta-Chrome autosorb-1. The samples were degassed at 373 K and  $10^{-3}$  Pa for 8 h prior to the adsorption measurements. Specific surface areas were calculated by the BET method. Scanning electron microscopy (SEM) images were recorded using a Quanta 200 FEG (FEI Co.) scanning electron microscope. Transmission electron microscopy (TEM) images were obtained on a JEOL 2000EX electronic microscope operating at 120 kV. The samples were prepared by dispersing the powders in ethanol and the dispersion was dropped on a carbon polymer supported on a copper grid. High resolution transmission electron microscopy (HRTEM) images were obtained with Tecnai G2 F30 S-Twin Transmission Electron Microscope operating at 300 kV. X-ray photoelectron spectroscopy (XPS) was performed with an ESCALAB MK-II spectrometer (VG Scientific Ltd., UK) using  $\text{Al K}\alpha$  radiation (1486.6 eV). Charging effects were corrected by adjusting the binding energy of C1s to 284.6 eV. Raman spectra were recorded with a Renishaw Raman spectrometer equipped with a He/Ne laser with a wavelength of 514 nm.

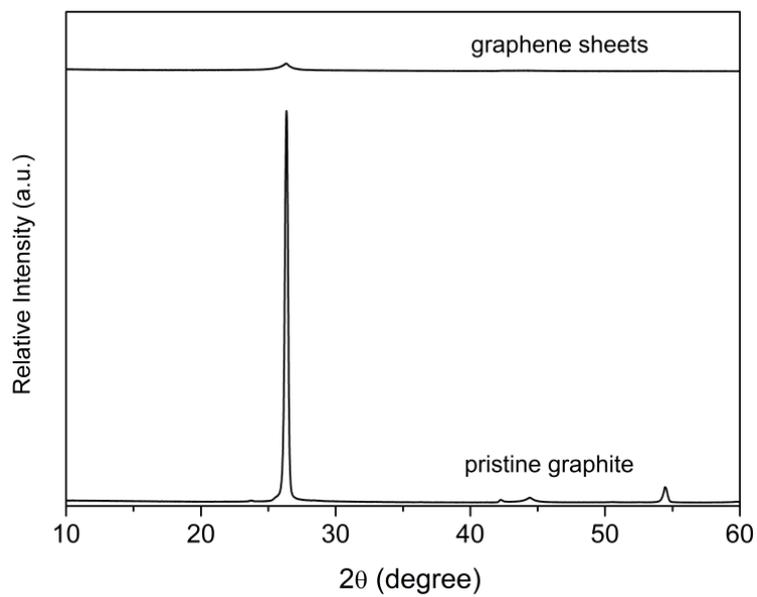
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Fig. S1 XRD patterns of pristine graphite, NH<sub>3</sub>BH<sub>3</sub> and post-milled samples with different graphite/NH<sub>3</sub>BH<sub>3</sub> weight ratios milled at 150 rpm for 4 h.

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Fig. S2 XRD patterns of pristine graphite and graphene.

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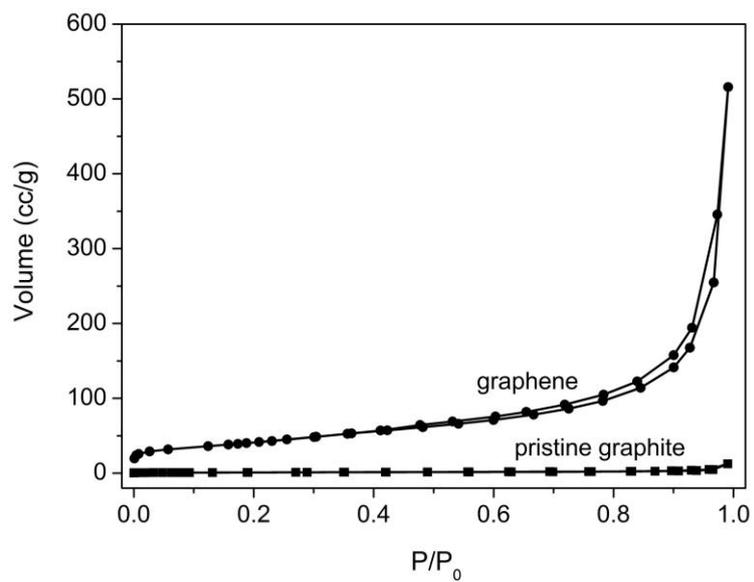


Fig. S3 N<sub>2</sub> adsorption-desorption isotherms of pristine graphite and graphene.

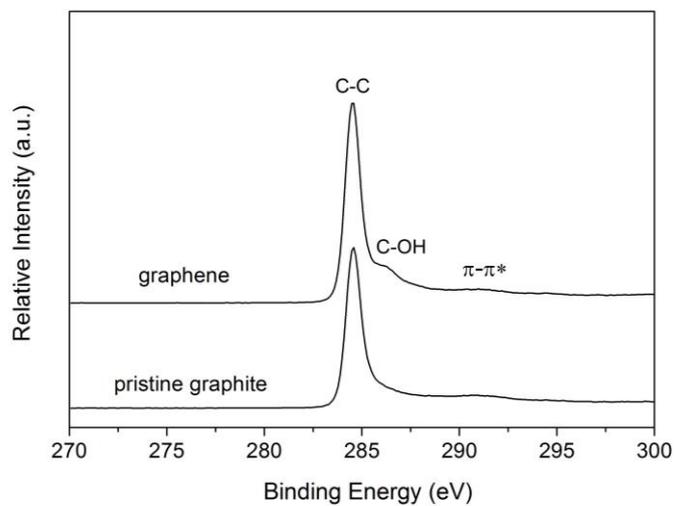


Fig. S4 C1s core-level XPS spectra of pristine graphite and graphene.

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