Electronic Supplementary Material (ESI) for Physical Chemistry Chemical Physics.

Supporting Information

Piezoresistive and Chemiresistive Gas Sensing by Metal-free Graphene Layers

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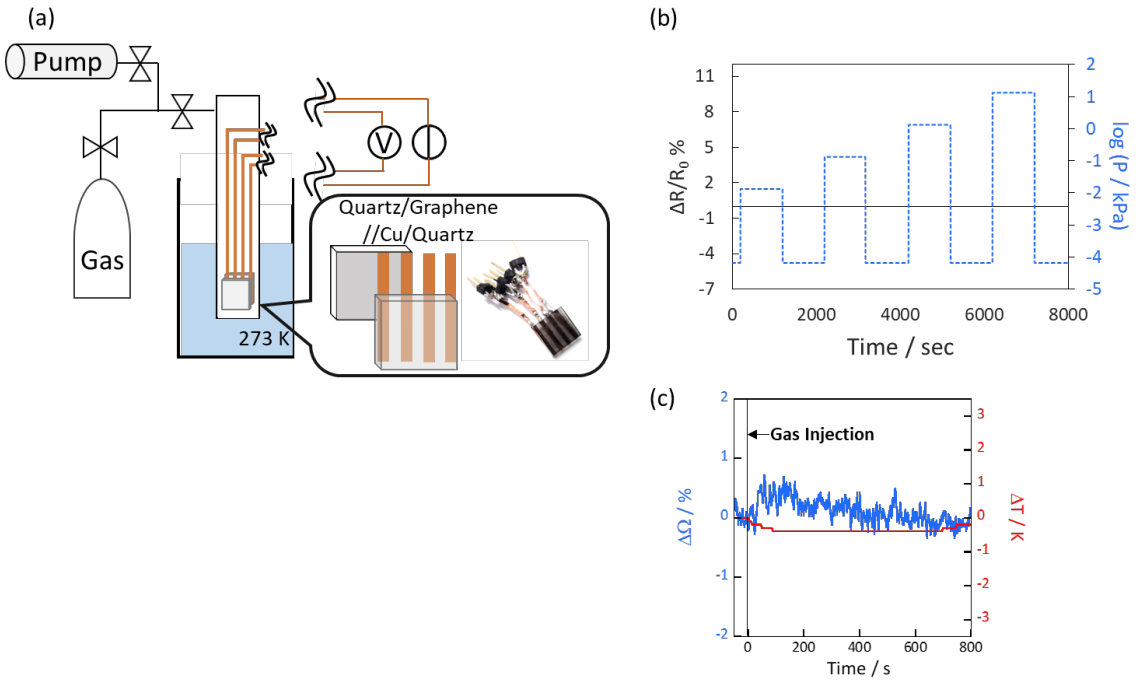

Fig. S1 (a) Image of gas sensing apparatus. (b) Experimental condition of registance responses by gas injection. (c) Influences of resistance and temperature by He gas injection.

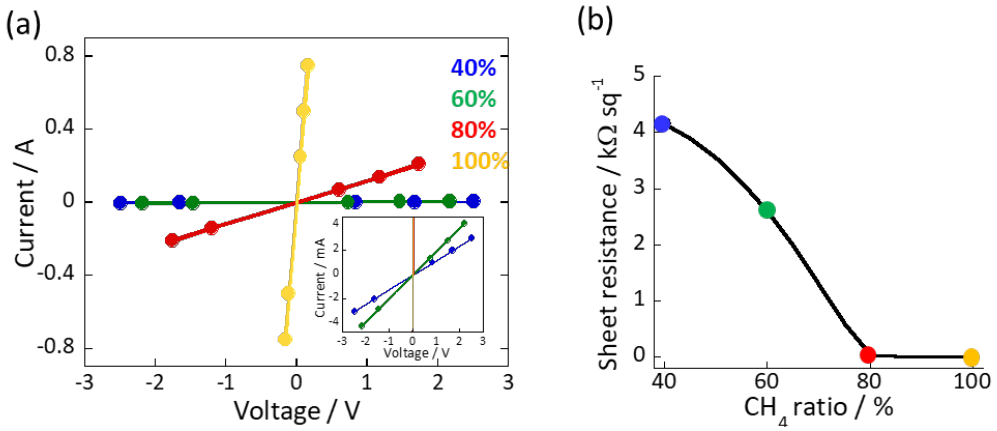

Fig. S2 Current-potential relation (a) and sheet resistance (b) of the GBSs *in vacuo*.

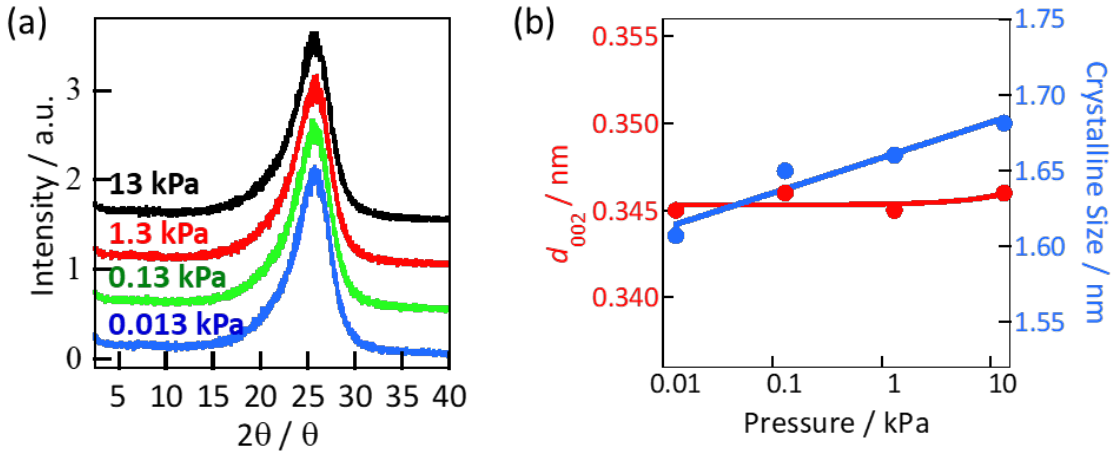

Fig. S3 (a) XRD of GBS of 100% CH_4 ratio. (b) Pressure dependence of crystal structure of GBS for 100% CH_4 ratio at 0–100 kPa. Filled symbol: He gas injection and opened symbol: He gas removal.

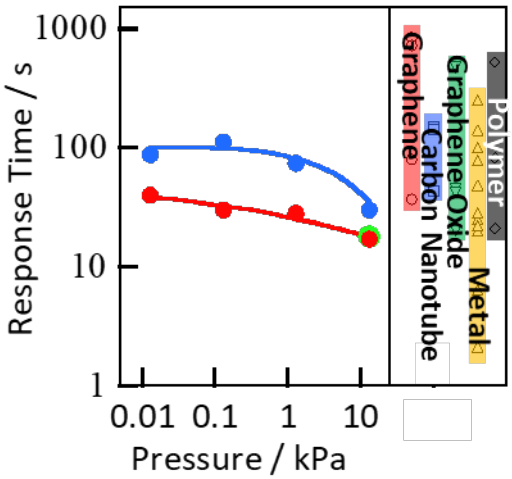

Fig. S4 Response time for NH_3 sensing of GBS by 40% (blue), 60% (green), and 80% CH_4 (red). The response time of other materials was depicted in the right.[1-26]

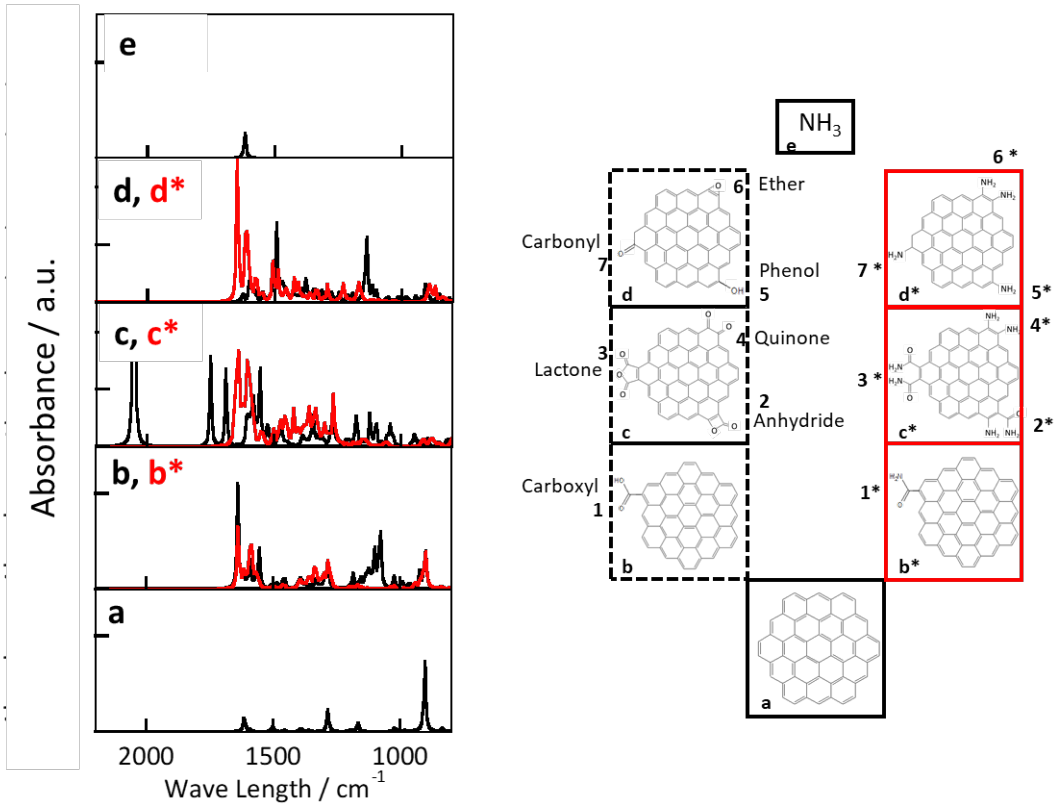

Fig. S5 Calculated absorbance of IR spectra for coronene and coronene derivatives with oxygen and nitrogen atoms (black curves). Solid and dashed curves represent NH_3 chemisorbed-coronene derivatives with oxygen atoms, and coronene derivatives with oxygen atoms, respectively. a: coronene, b: coronene with carboxyl group, b*: coronene with amide bond on carboxyl group, c: coronene with lactone, c*: coronene with amide bond on lactone group, d: coronene with carbonyl group, d*: coronene with amide bond on carbonyl group, and e: NH_3.

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