

Black Phosphorus Gas Sensors

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Supporting Information

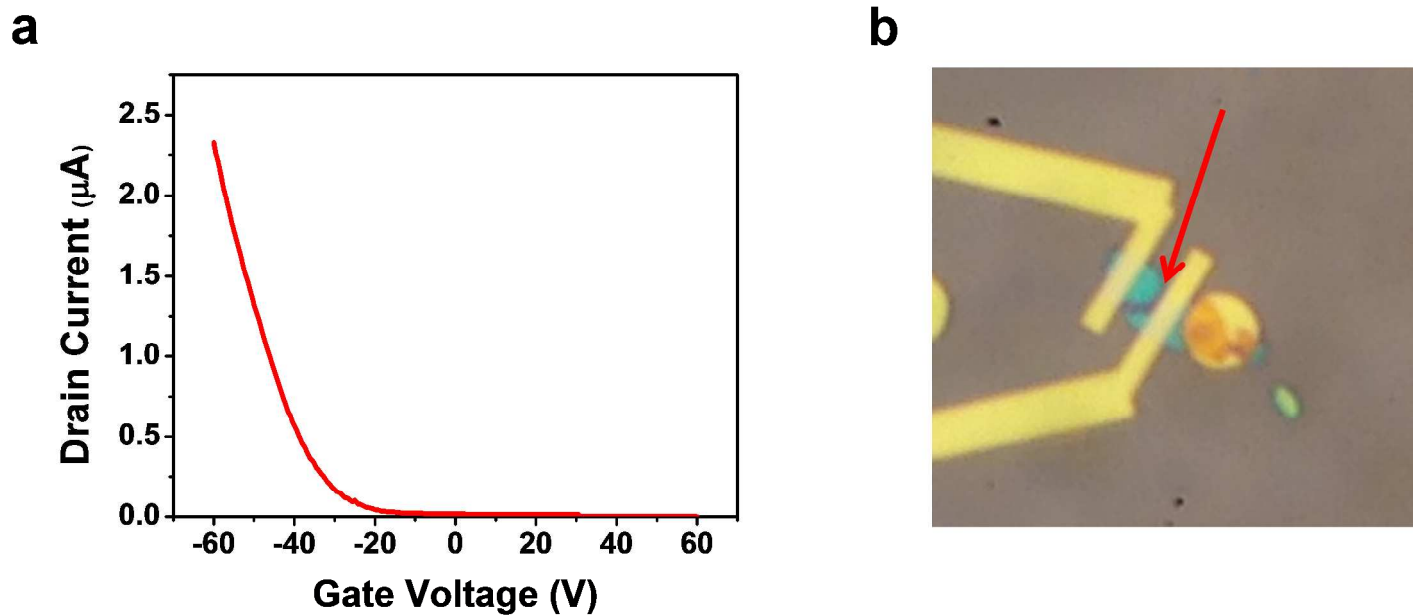


Figure S1. Stability of thin BP flake FET. a) I_d - V_g curve of a ~ 10 nm flake BP FET under a 50 mV V_d before failing. (b) Optical image of the device in (a) after repeated measurements in air showing a breaking point in the BP channel pointed by a red arrow.

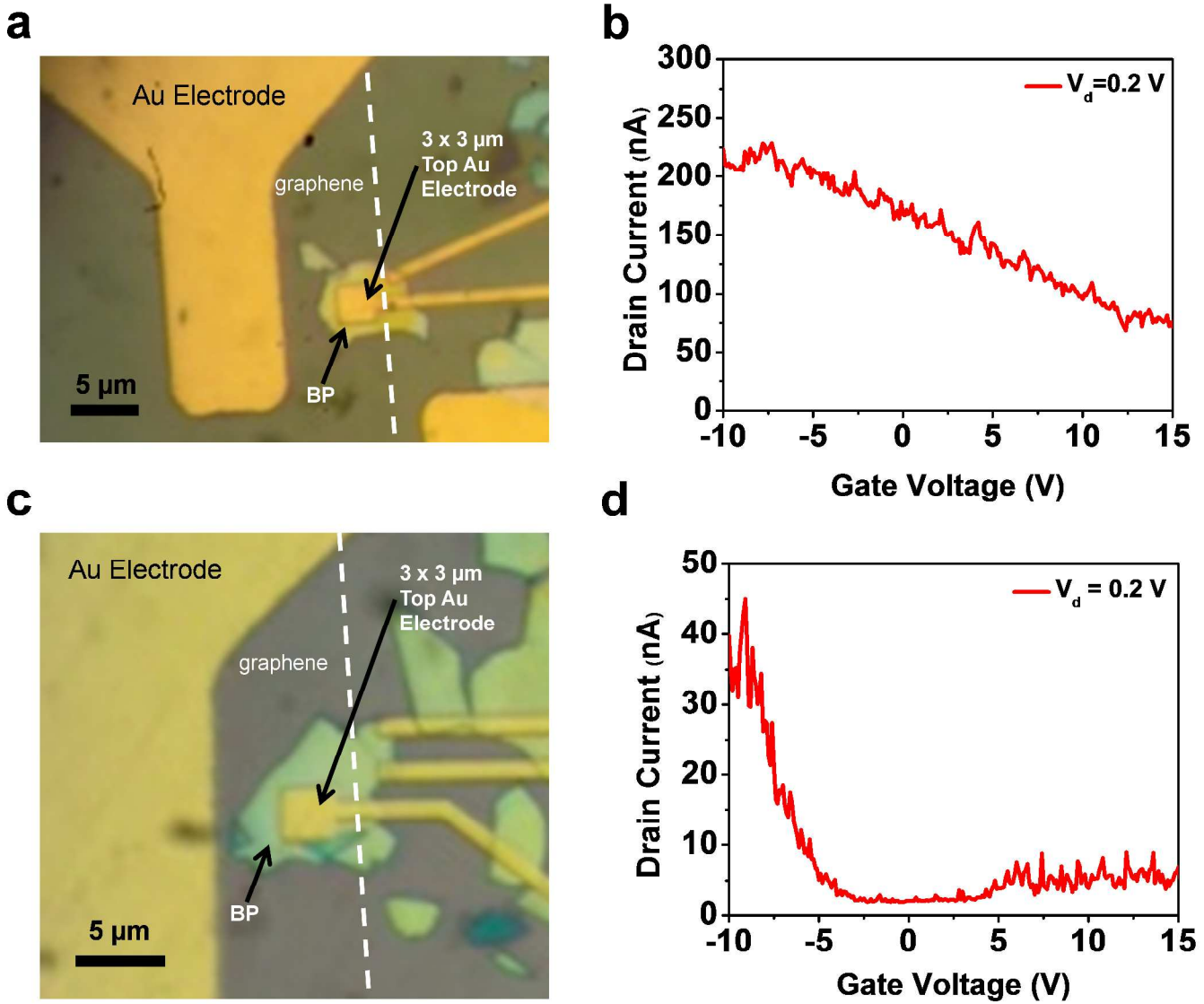


Figure S2. Vertical transport in multilayer BP flakes. a, c) Optical microscope image of a vertical FET comprised of a bottom monolayer CVD graphene electrode/BP/top (Ti/Au) electrode with a P^{++} Si/ 300 nm SiO_2 back gated structure. Dashed line is a guide to the eye of the monolayer CVD graphene border. b, d) I_d - V_G curves for the devices in (a) and (c) respectively under $V_d=0.2$ V.

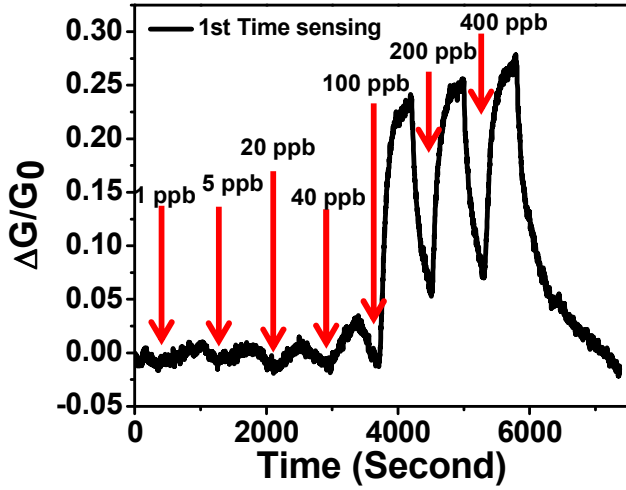
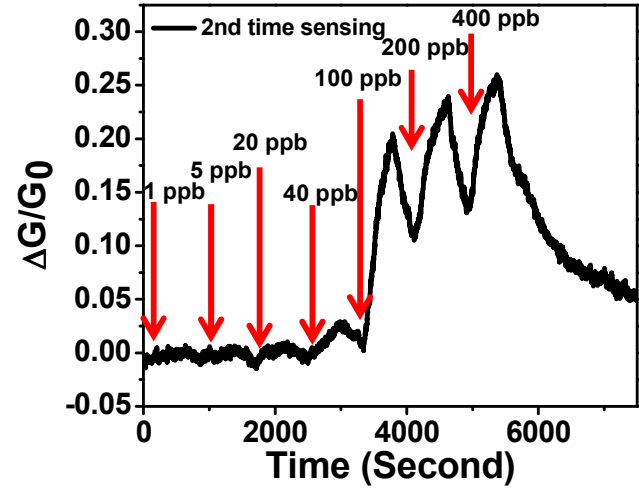
a**b**

Figure S3. Repeatability of BP sensor. (a) Relative conductance change ($\Delta G/G_0$) vs. time in seconds for a multilayer BP sensor for a first time sensing and b) For a second time showing similar response to various concentrations of NO_2 .