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

Probing the electric double-layer capacitance in Keggin-type polyoxometalate ionic liquid gated graphene transistor

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Supplementary Information

Layer No	1	2	3	Graphite
I_{2D}/I_G	4.5	3.1	1.4	0.9

Table S1. Comparison of Raman parameter: peak intensity ratio of 2D and G peak for single- and few-layered graphene.

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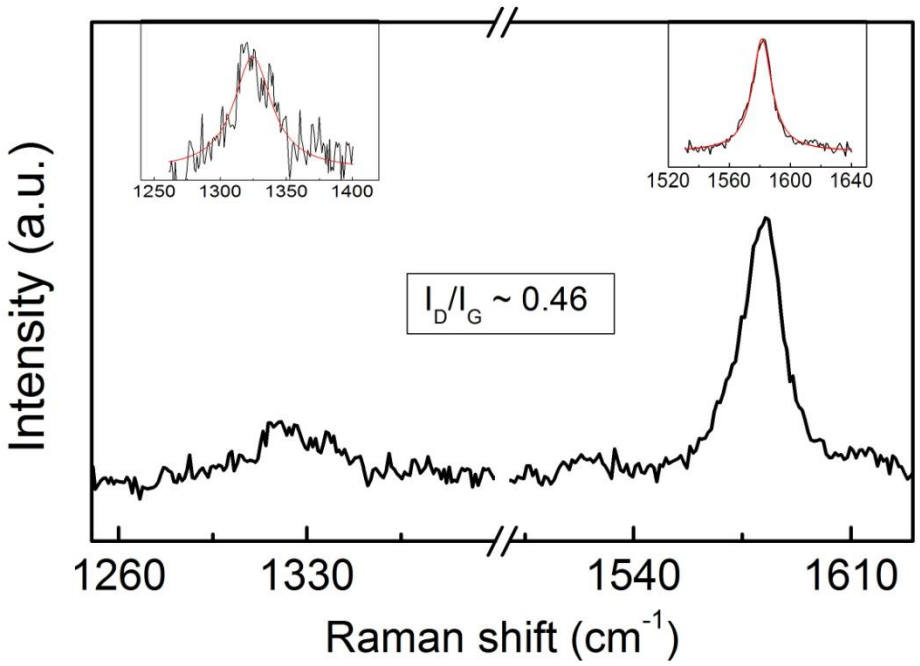

Fig. S1. Raman spectrum of CVD grown graphene indicating the defect peak intensity**.** Inset show Lorentzian fits to the raw data for D- and G-peaks.

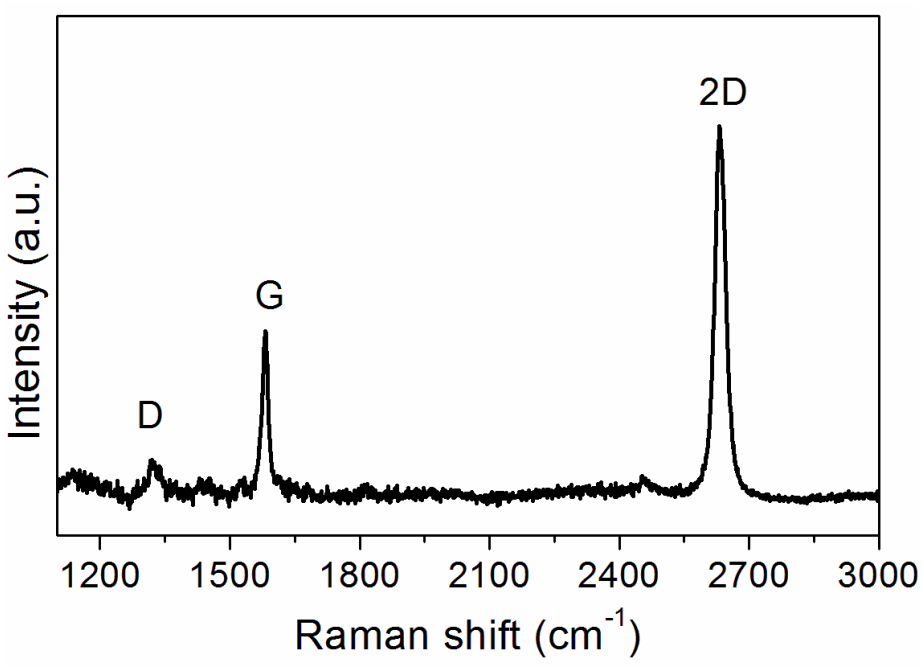

Fig. S2. Full-range Raman spectrum of CVD grown graphene on Si/SiO_2 substrate**.**

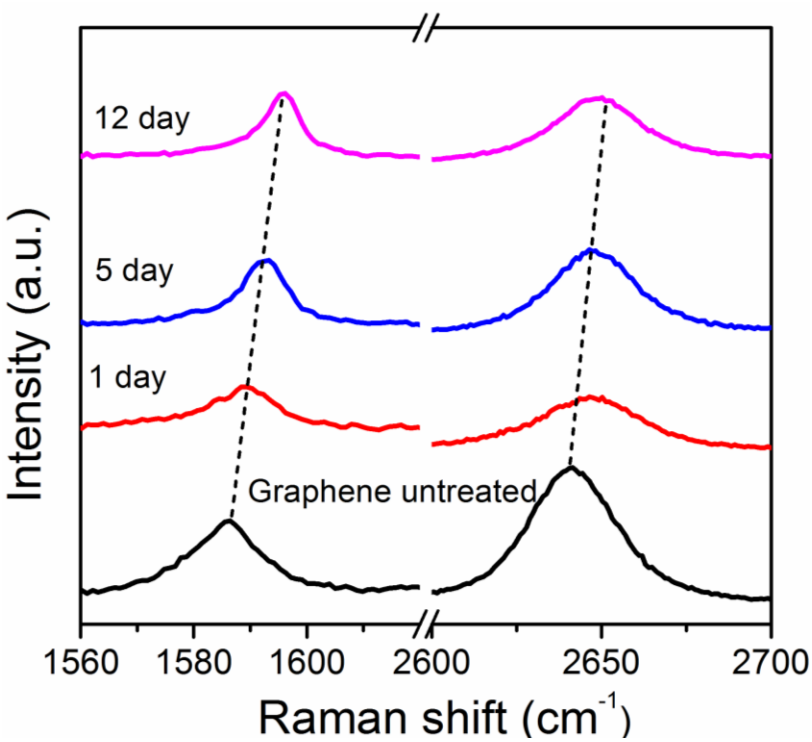

Fig. S3. Raman spectra of graphene taken at different time after casting TOA-PWCu ionic liquid without applied voltage.

The room temperature Raman spectra shows gradual shifts with time at zero applied bias, likely due to changes in the equilibrium assembly of ions. Our future work will look into the possibility of reducing this drift by storing the ionic liquid at lower temperatures.

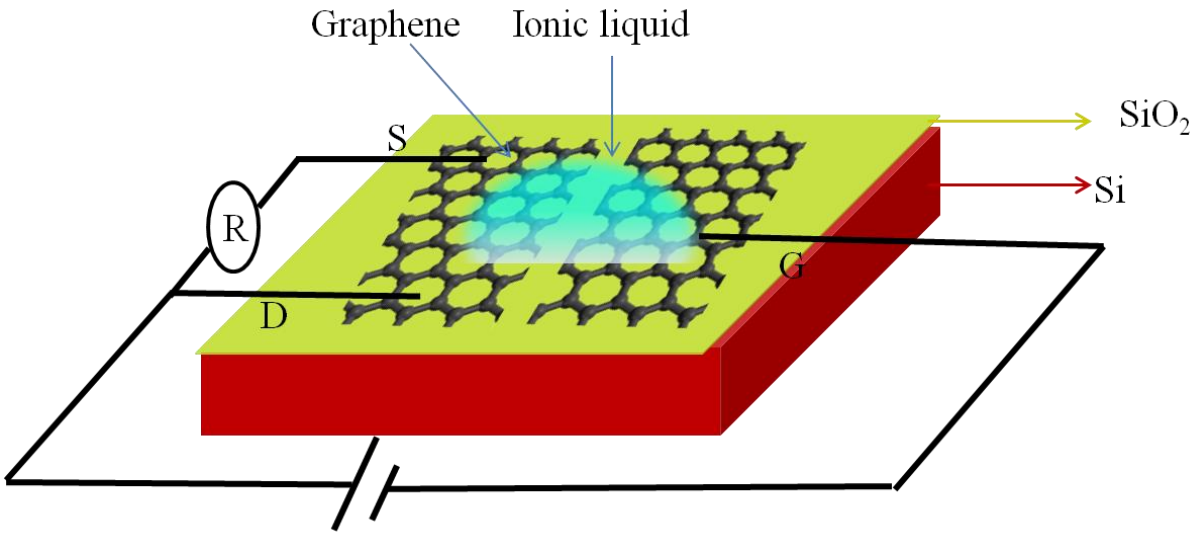

Fig. S4. Schematics of transport mesurement setup.

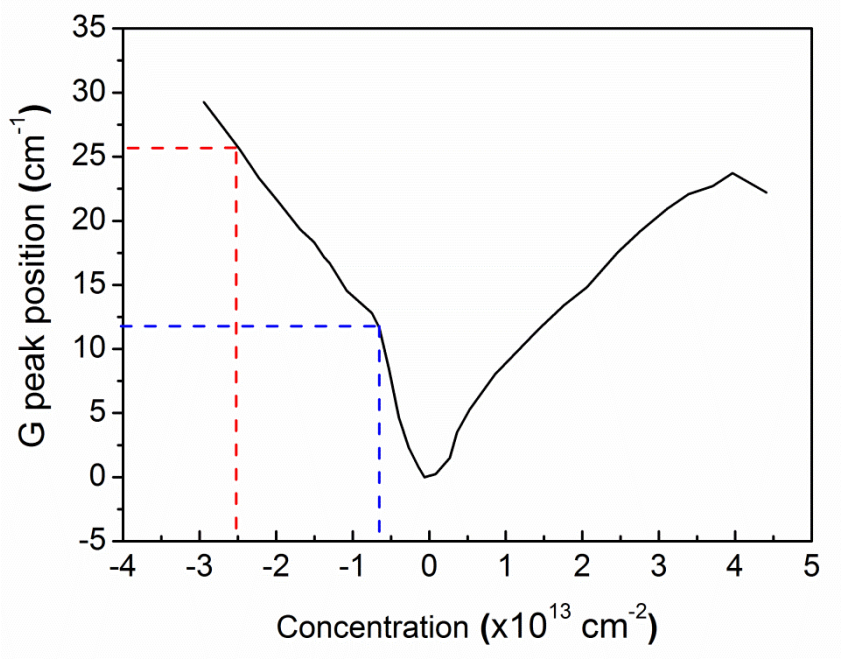

Fig. S5. Extraction of hole concentration from G peak shift. Reference curve is taken from Das et al. [1].

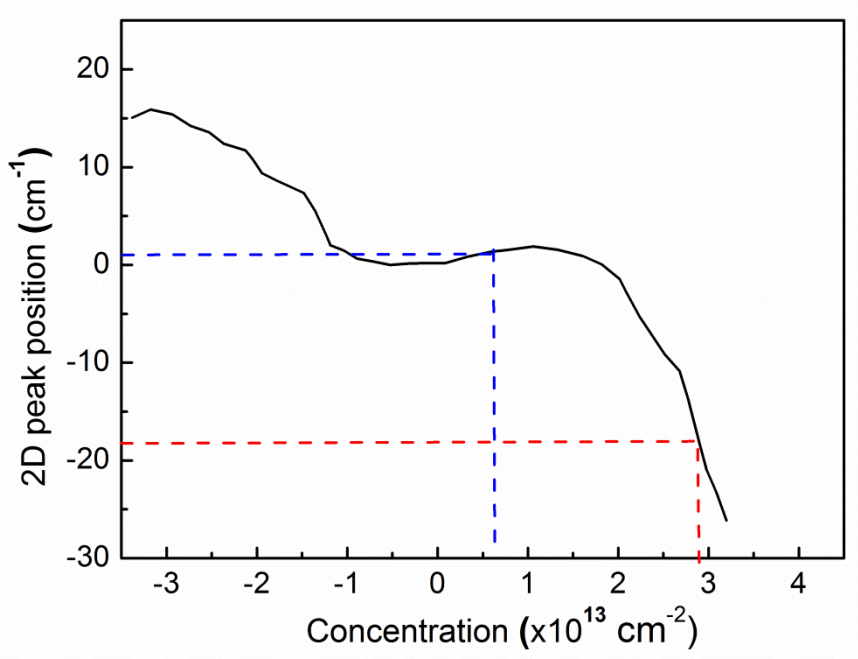

Fig. S6. Extraction of electron concentration from 2D peak shift. Reference curve is taken from Das et al. [1]

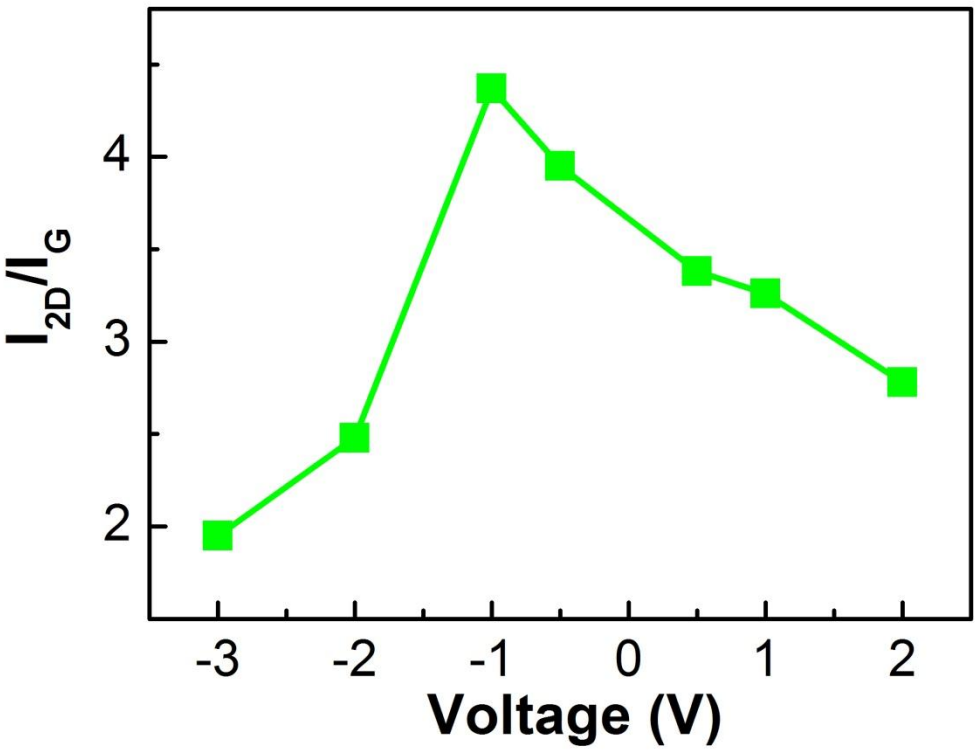

Fig. S7. Intensity ratio of 2D peak and G peak verses applied voltage for the keggin type ionic liquid.

Reference

[1] Das A; Pisana S; Chakraborty B; Piscanec S; Saha, S. K.; Waghmare, U. V.; Novoselov, K. S.; Krishnamurthy, H. R.; Geim, A. K.; Ferrari, A. C.; Sood, A. K. Monitoring dopants by Raman scattering in an electrochemically top-gated graphene transistor. *Nat Nano* **2008**, 3, 210-215.