Gate-tunable one-dimensional charge pattern on a graphene device

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The ability to modify the electronic properties of monolayer graphene via molecular doping creates opportunities for fabricating novel nanoscale logic and memory devices. Understanding charge transfer properties and electronic behavior at the molecule/graphene interface is essential for tuning the electronic and magnetic characteristics of these hybrid devices. We have created one-dimensional molecular arrays through molecular self-assembly on a gate-tunable graphene device. Using electrostatic gating[1], we were able to control the Coulomb interaction between individual molecules and create switchable periodic charge patterns along the one-dimensional molecular array on graphene surfaces. Scanning tunnelling spectroscopy was used to locally probe the electronic structure and the charge state of the molecular array.

References

[1] Sebastian Wickenburg, Nat. Commun., 7 (2016) 13553