Abstract Submitted
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Electrostatically Controlled Graphene Thermocouple PATRICK HERRING, ALLEN HSU, MIT, NATHANIEL GABOR, UC Riverside, YONG CHEOL SHIN, JING KONG, TOMAS PALACIOS, PABLO JARILLO-HERRERO, MIT — Graphene has a broad-band optical absorption ranging from the visible (λ<532 nm) all the way to the far-infrared (λ>10μm). Additionally, graphene's optical phonon energy and electrostatically tunable Fermi energy are in the mid-infrared energy range. Together, determining these properties could enable a new generation of carbon-based infrared photodetectors. Electrostatically gated p-n junctions have demonstrated photocurrents in near-IR measurements (850nm), generated primarily through photo-thermoelectric effects. By fabricating electrostatically controlled p-n junctions using chemically vapor grown graphene, we determine the photoresponse mechanism to be primarily thermoelectric in nature at mid-infrared wavelengths and strongly influenced by substrate interactions.

Patrick Herring
MIT

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