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Photo response of multi-layer graphene sheet and nanoribbons

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Graphene, a single-layer of carbon atoms bonded in a 2D honeycomb structure, has recently attracted a lot of attention, owing to its unique electrical, optical and mechanical properties. In this talk, I will describe a spectral sensing system based on structured multiple layer graphene for photo detection. The device consists of a multi-layer graphene (MLG) sheet or multi-layer graphene nano ribbons (GNRs), contacted with two different metal electrodes. MLG was mechanically exfoliated from highly ordered pyrolytic graphite (HOPG) and GNRs were defined by electron beam and/or focused ion beam lithography. Both MLG and GNRs are chosen as photon absorption material, because of their high light absorption and photo responsivity. Electrodes with different work functions (one higher than graphene and the other lower than graphene) were chosen to form asymmetric Schottky contacts, thus to break the mirror symmetry of the internal electrical field in a metal-MLG (or GNRs)-metal device. We measured the photo response of the device under a modulated continuous wave laser (488nm), which offered a spot of ~2mm in diameter and covered all the effective device area. Photocurrent generated from incident photons is observed to initially increase and then reach a saturation level with the increasing laser power.

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