

Terahertz plasmonic rectification using graphene-based field effect transistors

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Abstract

In this work, an exfoliated graphene sheet was encapsulated between two flakes of h-BN and placed on a highly doped SiO₂/Si substrate. An asymmetric dual-grating gate as well as a bow-tie antenna was implemented on the top h-BN flake. The device was characterized under excitation of terahertz radiation at three tones frequencies: 0.15, 0.3, and 0.6 THz from 4K up to room temperature. The dependence of the photocurrent as a function of the incoming radiation and gate biases (top and bottom gates) indicates the plasmonic rectification based on the ratchet effect. The photocurrent signal intensity was enhanced by appropriate biasing which open the way to use those devices for applications for terahertz technology.
