Coupling between different polaritons in an in-plane graphene/h-BN heterostructure

Xiaoxia Yang
Xiangdong Guo, Hai Hu, Qing Dai

National Center for Nanoscience and Technology, No. 11 Beiyitiao, Zhongguancun, Beijing, China

yangxx@nanoctr.cn

Abstract

The high-confined, dynamical tunable and intrinsic low damping graphene plasmon has important applications such as in enhanced IR spectroscopy [1-3], waveguide and modulator. Seamlessly connected in-plane graphene/h-BN heterostructure can further integrates the advantages of graphene plasmon and h-BN phonon polaritons [4]. The coupling between graphene plasmon and h-BN phonon polariton is studied using a full-wave electromagnetic numerical model. The transmittance is determined by momentum matching, which can be controlled between 0% and 100% within the upper Reststrahlen band of the BN and be tuned using the graphene Fermi energy. This study paves a way to design nanoscale multifunctional waveguide devices in integrated photonic systems.

References