474
Accession number:WOS:000307089200014
Title:Terahertz plasmon and infrared coupled plasmon-phonon modes in graphene
Authors:Dong, H. M. (1); Li, L. L. (1); Wang, W. Y. (1); Zhang, S. H. (1); Zhao, C. X. (1); Xu, W. (1)
Author affiliation: (1) Chinese Acad Sci, Inst Solid State Phys, Key Lab Mat Phys, Hefei 230031, Peoples R China
Abbreviated source title:PHYSICA E
Volume:44
Issue:9
Issue date:JUN 2012
Pages:1889-1893
Language:English
ISSN:1386-9477
Document type:Article
Publisher:ELSEVIER SCIENCE BV, PO BOX 211, 1000 AE AMSTERDAM, NETHERLANDS
Abstract:Plasmon and coupled plasmon-phonon modes of Dirac particles in graphene are investigated theoretically within the diagrammatic self-consistent field theory. It shows that two terahertz plasmon modes and four infrared coupled plasmon-phonon modes can be achieved via intra- and inter-band transitions in graphene. We find that with increasing q and carrier density, the plasmon modes are strongly coupled with optic-phonon modes in graphene in the infrared region. The coupled plasmon-phonon modes exhibit some interesting features which can be utilized to realize the plasmonic devices. Our results suggest that the carrier-phonon interaction should be considered to understand and explain the properties of elementary electronic excitations in graphene. 
Number of references:24
Main heading:Science & Technology - Other Topics; Physics
DOI:10.1016/j.physe.2012.05.013