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Title:Charge dynamics and electronic structures of monolayer graphene with molecular doping
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Abstract:THz absorption and spectroscopic ellipsometry were used to investigate the charge dynamics and electronic structures of monolayer graphene with doping by triazine. The absorption spectrum of the triazine-doped film shows an optical excitation near 5.1 eV that is blue shifted compared with that of undoped analog. THz conductivity displays a coherent response of itinerant charge carriers at zero frequency and a disorder-induced finite frequency peak around 155 cm^{-1}. Drude plasma frequency (~4400 cm^{-1}) decreases with decreasing temperature while carrier relaxation time (~13 fs) is almost temperature independent, implying the semiconducting behavior with thermal activation energy of 3 meV.
Number of references:38
Inspec controlled terms:carrier relaxation time - electronic structure - elemental semiconductors - ellipsometry - graphene - monolayers - organic compounds - semiconductor doping - semiconductor thin films - spectral line shift - terahertz wave spectra
Uncontrolled terms:charge dynamics - electronic structure - monolayer graphene films - molecular triazine doping - THz absorption spectrum - spectroscopic ellipsometry - optical excitation - blue shift - THz conductivity - itinerant charge carriers - disorder-induced finite frequency peak - Drude plasma frequency - carrier relaxation time - semiconducting behavior - thermal activation energy - terahertz wave spectra - C
Inspec classification codes:A7220J Charge carriers: generation, recombination, lifetime, and trapping (semiconductors/insulators) - A6817 Monolayers and Langmuir-Blodgett films - A7870G Microwave and radiofrequency interactions with condensed matter - A6170T Doping and implantation of impurities - A7360T Electrical properties of fullerenes and related materials (thin films/low-dimensional structures) - A6148 Structure of fullerenes and fullerene-related materials - A7125X Electronic structure of fullerenes and fullerene-related materials; intercalation compounds - A7125R Electronic structure of crystalline elemental semiconductors - A7360J Electrical properties of elemental semiconductors (thin films/low-dimensional structures) -

B2520C Elemental semiconductors - B2550B Semiconductor doping
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