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Ultrafast dynamics of non-thermal hot electrons in chemical vapor deposited graphene KUAN-CHUN LIN, MING-YANG LI, CHENG-CHUNG CHI, JENG-CHUNG CHEN, None, DEPARTMENT OF PHYSICS, NATIONAL TSING-HUA UNIVERSITY TEAM — The relaxation dynamics of photoexcited carriers in a chemical vapor deposited graphene transferred on quartz substrate are investigated using ultrafast optical-pump terahertz (THz)-probe spectroscopy. Terahertz transmission through graphene sample is reduced by optical pumping. The change of transmission decays exponentially after the optical pulse. We find the decay time is insensitive to the substrate temperatures from 10 K to 300 K, but increases sublinearly with pump flunce. We model the relaxation process involving electron-phonon coupling together with a set of rate equations to describe the transient responses of quasi-particals and optical phonons. We can fit the observered transient terahertz transmission very well. The extracted carrier temperature follows the same trend of decay time as a function of fluence. High pump fluence can significantly increase the carrier temperature and broaden the carrier distributions, consequently causing the reduction of optical phonon emission efficiency and slowing down cooling rate. The differences of our results in comparison to similar measurements of expitaxial graphene on SiC will be disscussed.

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None

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