

Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

Observation of coherent G-mode phonon oscillations in graphene films J.-H. KIM, Chungnam National University, M.H. JUNG, B.H. HONG, Sungkyunkwan University, E.H. HAROZ, J. KONO, Rice University, K.J. YEE, Chungnam National University — We have observed coherent G-mode lattice vibrations in three stacked-mono layer and multi-layer graphene films by using ultrashort pulses from a Ti:Sapphire laser. The degenerated E_{2g} modes were excited through the impulsive stimulated Raman scattering process, and detected through induced reflectivity modulations. The G-mode frequency from the stacked-mono layer graphene is shifted toward higher energy compared with that of the multi-layer graphene. A dephasing time of about 0.6 ps for the stacked-mono layer graphene was found to be shorter than that of semiconducting single-walled carbon nanotubes (1.48 ps) and slower than that of metallic single-walled carbon nanotubes, due to stronger electron-phonon interactions, where the phonon energy can be dissipated by exciting electrons between a linear bands of graphene. Through the strong polarization dependence of coherent G-mode lattice vibrations, we confirmed that the $E_{2g}^{(2)}$ symmetry is dominant.

Ji-Hee Kim
Chungnam National University

Date submitted: 16 Dec 2010

Electronic form version 1.4