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Raman Scattering from few-layer Graphene Films A. GUPTA, Dept. of Physics, The Pennsylvania State University, P. JOSHI, T. SRINIVAS, Dept. of Electrical Engineering, The Pennsylvania State University, PETER EKLUND, Department of Physics, The Pennsylvania State University, University Park, PA 16802 USA — Few layer-graphene sheet (nGL's) films, where n is the number of graphene layers, are new two-dimensional sp^2 carbon systems that have been shown to produce exciting Fractional Quantum Hall phenomena. We report here on the first Raman scattering (RS) results of nGLs. nGLs with lateral dimensions of ∼1-3 μm were prepared by chemical delamination of graphite flake or HOPG and then transferred from solution onto substrates (mica, pyrex,In/pyrex and Au/pyrex). RS spectra have been collected on nGL's with n=1, 2, 3 and compared with the graphite. Graphite exhibits two E_{2g} interlayer modes at 42 cm^{-1} and 1582 cm^{-1}. The Raman spectra of (n=1-3) nGLs were found to exhibit peaks at 1350 cm^{-1} and 1620 cm^{-1}, i.e., near frequencies associated with high phonon density of states. The high frequency E_{2g} band is found to split into two bands when the nGL is supported on metallic substrates (In,Au). In both these cases, we observe bands at 1583 cm^{-1}, ∼1592 cm^{-1} rather than one band at 1581 $cm^{-1}$when the nGL is on insulating pyrex. The splitting of the interlayer band when on metallic substrates is identified with charge transfer between the nGL and the substrate. The phonon density of states scattering observed does not appear to be due to disorder in the basal plane.

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