Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

Raman scattering from the CaC_6 superconductor A. MIALITSIN, Rutgers University, J. KIM, R. KREMER, MPI fuer Festkoerperforschung, G. BLUMBERG, Bell Labs, Alcatel-Lucent — A polarized Raman scattering study has been performed on bulk 1st stage intercalated graphite CaC_6 crystals at sub-T_c temperatures. We identify all three Raman active E_g bands expected for the $Rm\bar{6}$ space group of CaC_6 at 440, 1120 and 1508 cm^{-1} and find them to be in agreement with zone center modes predicted by first principles calculations of phonon dispersion.[1] In addition the equivalents of the graphite D and G bands are observed at respective frequencies. Inherent to the disorder induced double resonant scattering process[2] the D band shifts from 1308 cm^{-1} to 1332 cm^{-1} upon the change of the excitation laser wavelength from 647 nm to 476 nm. Assuming linear dependence of the D band peak position as a function of excitation energy this translates to the frequency shift of 35 cm^{-1} / eV. By comparing the integrated intensity of the G band at 1582 cm^{-1} in CaC_6 to the one in kish graphite the relative fraction of higher stage domains to the 1st stage intercalation is estimated to be less then 0.2%. Finally upon the superconducting phase transition we observe a 2Δ peak with the frequency of 24 cm^{-1} at 5 K. With temperature increase this peak persists shortly up to the SC phase transition at 11.6 K and shows temperature dependence consistent with the strong coupling regime. [1]M. Calandra and F. Mauri, PRL **95**, 237002 (2005). [2]C. Thomson and S. Reich, PRL **85**, 5214 (2000).

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Date submitted: 02 Jan 2008 Electronic form version 1.4