Abstract Submitted
for the MAR07 Meeting of
The American Physical Society

Far-infrared signature of a superconducting gap in intercalated graphite CaC_6. U. NAGEL, D. HUVONEN, T. ROOM, NICPB, Tallinn, J.S. KIM, L. BOERI, R. K. KREMER, MPI for Solid State Physics, Stuttgart, F. S. RAZAVI, Brock Univ., St. Catharines, Ont. — CaC_6 is exceptional in the series of intercalated graphite compounds because of its high superconducting transition temperature, T_c=11.5K. The superconducting gap, 2Δ=25.6 $\pm$ 3.2cm^{-1}, measured by scanning tunneling spectroscopy (N. Bergeal et al., PRL **97**, 077003 (2006)), is consistent with the weak-coupling BCS type superconductivity. The superconducting gap can be directly probed also by far-infrared spectroscopy. We studied the reflectance R of CaC_6 between 4 and 100cm^{-1} from 3K to 15K. We see the signature of the superconducting gap in the reflectance ratio of superconducting state R_s to the normal state $R_n$and can follow its temperature dependence. The appearance of the gap signature in R_s/R_n tells us that CaC_6 is in the dirty limit. Different models, including an anisotropic gap and a multi-gap scenario, will be discussed to fit the optical data.

Urmas Nagel
Nat.-l Inst. of Chem. Phys. & Biophys., Tallinn, Estonia

Date submitted: 03 Dec 2006 Electronic form version 1.4