Abstract Submitted
for the MAR07 Meeting of
The American Physical Society

**Strong electron-phonon coupling in the rare-earth carbide superconductor $La_2C_3$** REINHARD K. KREMER, J.S. KIM, W.-H. XIE, V. BABIZHETSKYY, O. JEPSEN, A. SIMON, MPI fuer Festkoerperforschung, Stuttgart, Germany, K.S. AHN, B. RAQUET, Yonsei University, Wonju, South Korea, H. RAKOTO, J.-M. BROTO, LNCMP, Toulouse, France, B. OULADDIAF, ILL, Grenoble, France — Superconductivity in rare earth carbides has attracted interested again after the recent discovery of the 18 K superconductor $Y_2C_3$. Here, we present the crystal structure as well as the superconducting properties of the rare-earth sesquicarbides $La_2C_3$ ($T_c \approx 13.4$ K) gained from low-temperature neutron powder diffraction, specific heat and electrical resistivity measurements. From a detailed analysis of specific heat as well as the comparison with the full potential electronic structure calculations, a quantitative estimate of the electron-phonon coupling strength and the logarithmic average phonon frequency is made. The electron-phonon coupling constant found to be $\lambda_{ph} \sim 1.35$, and the low energy phonon modes are responsible for the superconductivity. These results suggest that $La_2C_3$ is in the strong coupling regime and the relevant phonon modes are the La-related modes rather than the C-C stretching modes. The upper critical fields($H_{c2}$) show a clear enhancement with respect to the Werthamer-Helfand-Hohenberg prediction and amount to $H_{c2}(0) \sim 20$ T confirming the strong electron-phonon coupling.

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Date submitted: 21 Nov 2006 Electronic form version 1.4