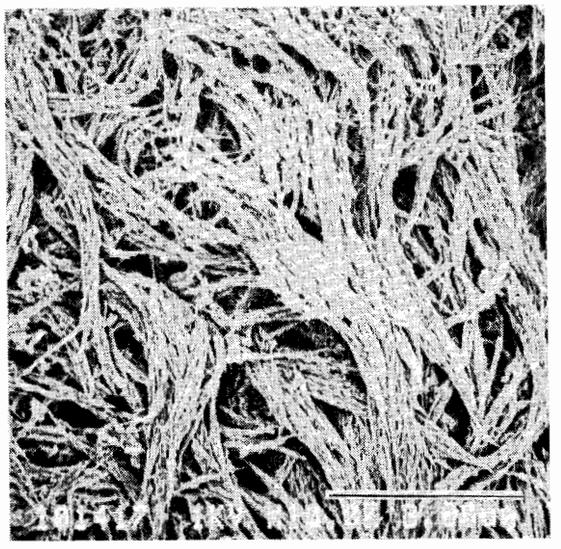

Fig. 1 A SEM image of the carbon nanotubes.

PS-10.02.10 NEGATIVELY CURVED STRUCTURES: FLEXI-CRYSTALLOGRAPHY By H. Terrones* and A. Mackay†. Instituto de Física, UNAM, Apartado Postal 20-364, 01000 México, D.F. †Birkbeck College, University of London, Malet Street, London WC1E 7HX , England, U.K.

The discovery of C_{60}, C_{70}, cylindrical graphite and other Fullerenes has opened the field of a new kind of materials with important properties. Starting from the concepts of 2-D manifolds or surfaces, negatively curved graphite structures are proposed. In C_{60} the positive Gaussian curvature is due to the presence of pentagonal rings of carbon. We have found that introducing rings with more than six carbon atoms, periodic graphite structures with the same topologies as triply periodic minimal surfaces can be constructed. Geometric properties and stability of these hypothetical structures are discussed. In general, the decoration of surfaces with different Gaussian curvatures (Flexi-crystallography) allows us to characterize structures already known and propose others waiting to be discovered.

PS-10.02.11 XAFS STUDIES ON Rb-DOPED C_{60} SUPERCONDUCTORS. By Y. Kubozono, I. Kimura, T. Fujimoto, A. Hirano, H. Maeda, S. Kashino, K. Oshima and H. Yamazaki, Faculty of Science, Okayama University, Japan, H. Ishida, College of General Education, Okayama University, Japan, T. Ishii, Faculty of Engineering, Okayama University, Japan, S. Emura, ISIR, Osaka University and K. Kato, Institute for Molecular Science, Japan.

The breakthroughs in synthesizing large amounts of Bukminster fullerene (C_{60}) and other fullerenes have made it possible to study their structures and properties(W. Kratschmer, L.D.Lamb, K.Fostiropoulos and R.D.Huffmann, Nature, 1990, 347, 354-358). Since the discovery of superconductivity in alkali-metal-doped compounds of C_{60} molecule, a number of intensive studies concerning the crystal structures have been reported based on powder and single crystalline X-ray diffraction and X-ray Absorption Fine-Structure (XAFS) methods (P.W.Stephens, L.Mihaly, J. B.Wiley, S-M.Huang, R.B.Kaner, F.Diederich, R.L.Whetten and K.Holczer, Phys. Rev., 1992, B45, 543-546). The purpose of the present work is to investigate the local structure around the Rb ions in Rb_3C_{60} in order to clarify the relation between the structure and superconducting phenomenon.

C_{60} powder were prepared by arc-heating of graphite under a 200-Torr He atmosphere and were subsequently separated chromatographically using an activated alumina column with benzene/hexane developer. The purity of the C_{60} was confirmed to be at least 99% by UV-VIS and NMR spectra. The C_{60} (25 mg) was placed in a pyrex tube (6 mm diameter) together with Rb. The small amounts of Rb metal were measured in metal-filled glass capillary tubes (0.5 mm diameter), which were cut and handled under a nitrogen atmosphere in a glove-box. The pyrex tubes containing C_{60} and the Rb were degassed to 10^{-2} Torr and sealed. These were then heated at 513 K for 64 hr. The transition temperature (Tc) was confirmed to be 27 K by a SQUID magnetometer (SHE VTS900).

XAFS measurements were performed using synchrotron radiation from the Photon Factory (PF) at the National Laboratory for High-Energy Physics (KEK, Tsukuba). The rubidium K-edge XAFS spectra of a superconducting Rb_3C_{60} and reference sample rubidium hydrogen L-tartrate (RbHTr: $C_4H_5O_6Rb$) were taken with the transmission mode at various temperatures from 10 to 300 K.

Figure 1 shows the Rb K-absorption spectra of (a) superconducting Rb_3C_{60}, (b) air exposed Rb_3C_{60} (non-superconducting) and (c) RbHTr at room temperature. The results of the EXAFS will be discussed in the presentation.

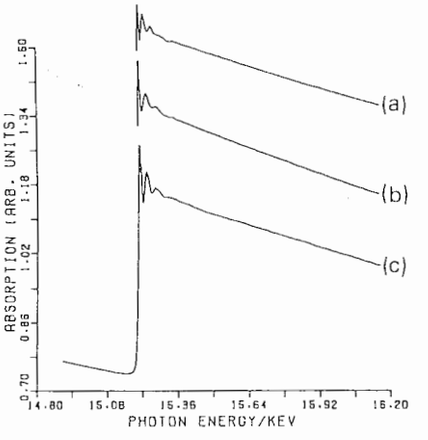

Fig. 1. Rubidium K-edge X-ray absorption spectra of (a) superconducting Rb_3C_{60}, (b) air exposed Rb_3C_{60} and (c) RbHTr at room temperature.

PS-10.02.12 MOLECULAR PACKING AND DISORDER IN $C_{60},2C_{81}H_{68}O_4$ COMPLEX. By B. Bachet*[a], D. André[b], H. Szwarc[b], R. Céolin[c], V. Agafonov[c], R. Chiarelli[d], C. Fabre[d] and A. Rassat[d], [a] Lab. Cristallographie, Univ. Paris VI, F-75005 Paris, [b] CPMA, Univ. Paris XI, F-91405 Orsay, [c] Fac. Pharmacie, F-37042 Tours, [d] Lab. Activation Moléculaire, ENS, F-75005 Paris.

