

## Spectroscopic studies of different phases of $\text{RbC}_{60}$

Petra Rudolf, Ingrid Marenne  
L.I.S.E., Facultés Universitaires Notre-Dame de la Paix,  
Rue de Bruxelles 61, B-5000 Namur, Belgium

T. Pichler  
Institut für Materialphysik Universität Wien, A-1090  
Wien, Austria

Lisbeth Kjeldgaard, P. Brühwiler  
Dept. of Physics, Uppsala University, Box 530, S-75121  
Uppsala, Sweden

R. Larciprete, A. Goldoni  
Elettra Sincrotrone Trieste, Area Science Park, I-34012  
Basovizza, Italy

A  $\text{RbC}_{60}$  film prepared by distillation in UHV, was investigated this film by X-ray absorption spectroscopy, valence band and core-level photoemission. The fcc phase obtained at high temperature (520 K), shows a very low spectral density at the Fermi level. When the sample is quenched to 50 K to obtain the monomer phase, a clear Fermi edge appears, indicative of a three-dimensional metallic character. A small extra component in the Rb 3d lines points to the presence of a few Rb atoms in tetrahedral sites. The Fermi edge spectral density disappears when the film is heated to 125 K to induce formation of the dimer phase. The sample was further annealed to 370 K to produce the polymer phase with double bonds linking the molecules along one crystal axis: although recent NMR measurements by Mehring et al.[1] find that the conduction electrons of this phase have a delocalized character, we could not observe a clear Fermi edge in the valence band spectra. Moreover, we could not fit the spectral intensity in the Fermi region with an exponential law which would be typical of a 1D metal. Phase purity of the sample and differences between surface and bulk electronic structure will be discussed based on the core level spectra.

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[1] Mehring, M., Thier, K.-F., Rachdi, F., de Swiet, T., Cabon, 2000, **38**:p.1625