obtaining diamond from the carbon nanotubes in such conditions of pressure and temperature. Reaction of the Pt crucible was noticed and we are now testing new crucible for such conditions

ESRF	**Experiment title:** Nano-Extreme :Extreme conditions of pressure and temperature for the elaboration of new carbon based nano-materials	**Experiment number**: CH-1704
Beamline:	**Date of experiment**: from: 10 February 2005 to: 15 February 2005	**Date of report**:
Shifts:	**Local contact(s)**: O. Mathon / S. Pascarelli	*Received at ESRF:*

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Report:

Part III : HP & HT in inert conditions

Guest alkali atoms imply to work under inert conditions because they are easily water and air sensitive. We have to load the samples into a Paris Edinburgh cell using a portable device we called *clamp* (Fig. 6) allowing us to load the cell in a glove box. In fact, the two opposite diamond anvils are fixed each one on a copper frame serving to cooling down the anvils and to conduct electricity into the cell heater. The two copper parts are screwed in such way that we can pre-pressurise the cell in the glove box with a little press.

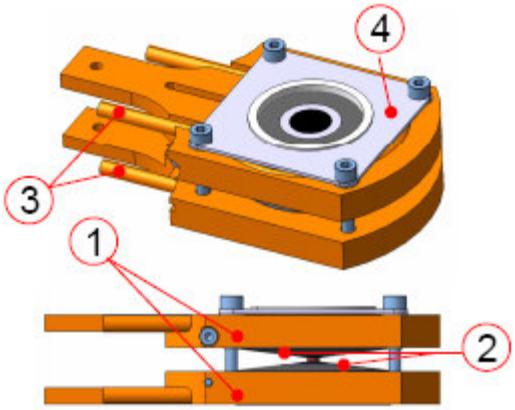

Figure 6. ***Inert atmosphere system currently used. The loading is done in a glove-box. A clamp system (1) compresses the anvils (2) isolating the sample with the help of a toroidal gasket (not shown). The clamp is water cooled (3) and electrically isolated (4).***

Rb intercalation of solid C_{60} has been analyzed by combining x-ray absorption spectroscopy and x-ray diffraction techniques. The V4 Paris-Edinburgh press was used as a pressure device while diffraction patterns were acquired with the MAR Image Plate system on BM 29. The full width at half maximum (FWHM) of the Bragg peaks corresponds to a $\Delta\theta/\theta$ in the 10^{-3} range. The sample preparation and the embedding of the 5 mm gasket into the WD anvils have been carried out in the glove box.

Measurements have been performed in the range of pressure 0.3-11.4 GPa at room temperature. Rb *K*-edge XANES spectra at room temperature as a function of pressure up to 11.4 GPa are shown in Fig. 7 while the experimental EXAFS signals are presented in Fig 8.

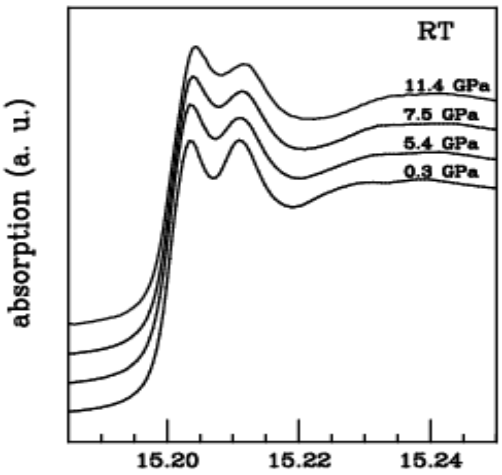

Figure 7. ***Rb K-edge XANES spectra at room temperature in a pressure range of [0.3-11.4] GPa.***

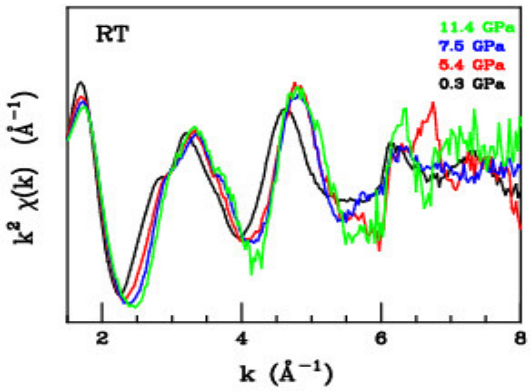

Figure 8. ***EXAFS oscillations at the Rb K-edge as a function of pressure.***

XRD patterns showed the presence of several phases into our Rb_xC_{60} doped fullerene (Rb_6C_{60}, Rb_3C_{60}, C_{60}, …). Consequently, XAS analysis is not possible for the present. Improvement of the sample preparation technique for rubidium doped C_{60} crystals are now in progress.

Conclusions

To conclude, despite some technical problems, we demonstrated that it is now possible to acquire **high quality classic EXAFS** data at pressures of **15 GPa and temperatures of 1500 °C**. These conditions are not routinely available and our work open new facilities in the high-pressure/high-temperature science.