




<b>Experiment title:</b> <b>Structural determination of an ordered monolayer of C<sub>60</sub> on Au(110)</b>	<b>Experiment number:</b> <b>SI-223</b>	
<b>Beamline:</b> BL3-ID7	<b>Date of experiment:</b> from:20/1/97 to:27/1/97	<b>Date of report:</b> 26/2/97
<b>Shifts:</b> 18	<b>Local contact(s):</b> S.Ferrer	<b>Received at ESRF:</b> 

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**Report:**

C<sub>60</sub> adsorbed on Au(110) (1x2) surface leads to an ordered (6x5) superstructure. To better understand the nature of the interaction of the first fullerene monolayer with the Au(110) substrate and to solve the geometrical details of the interface we have performed X-ray diffraction experiments of the (6x5)C<sub>60</sub>/Au(110) on the BL7-ID3 beamline.

The sample preparation was performed using the same procedure defined in our laboratory and lead to the appearance of sharp diffraction peaks belonging to the 6x5 reconstruction, By measuring the widths along the h and k directions we can affirm that the domain size is larger than 200 Å.

In figure we show the measured intensities of non integer peaks corresponding to the 6x5 reconstruction for a C<sub>60</sub> coverage of 1 monolayer.

We also measured the intensity of some of these peaks as a function of the vertical momentum transfer “ $l$ ” and some crystal truncation rods. With this data set we should be able to solve the structure including the vertical displacements of the surface substrate atoms and the vertical bond distance among the C<sub>60</sub> layer and the gold surface atoms. Data analysis is in progress.

Our data show the disappearance of the 1x2 clean substrate reconstruction upon deposition of C<sub>60</sub>, in agreement with a substrate surface atom rearrangement as suggested by STM measurements */1/*. However, at this stage of data analysis, we can affirm that the gold surface reconstruction is more complicated than the simple STM 1x5 model.

*/1/* J. Gimzewski, S. Modesti, R.R. Schlittler, Phys. Rev. Lett. 72, 1036 (1994).

