

**Experiment title:**

Temperature dependent local structure conformations in heme proteins studied by EXAFS

Experiment number:
LS-467**Beamline:**
BM-29**Date of experiment:**

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18**Local contact(s):**

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Report:

Structural changes of the iron-site of horse carbonmonoxy myoglobin induced by denaturing condition by adding different guanidine-hydrochloride (Gdn-HCl) concentrations (0.5 M and 1.4 M) have been studied by XANES technique. Variations of the Fe-CO bonding angles induced by protein denaturation have been determined. In fig. 1 the Fe K-edge XANES spectra of native and denatured horse MbCO measured at 25 K are reported; the zero energy corresponds to 7112.5 eV. In the inserts we show the spectral variations in the pre-edge region and in the region of the Cl peak (panel a and b respectively).

The Fe-CO bonding angles have been measured by XANES data analysis using the MS approach. The Fe-C-O bonding angle increases with the interaction between the protein and the heme. In fact by the increasing the compactness of the protein at low guanidine concentration the Fe-C-O tilting angle increases while by increasing the Gdn -HCl concentration the Fe-C-O tilting angle decreases in comparison with the native one.

By extended illumination, using a fiber optic white lamp, the photoproducts (Mb*) landscape has been analyzed as a function of temperature. An example of XANES difference Mb* - MbCO at low is reported in fig. 2.

This experiment has shown the feasibility of MbCO photolysis process at the BM29 beam line.

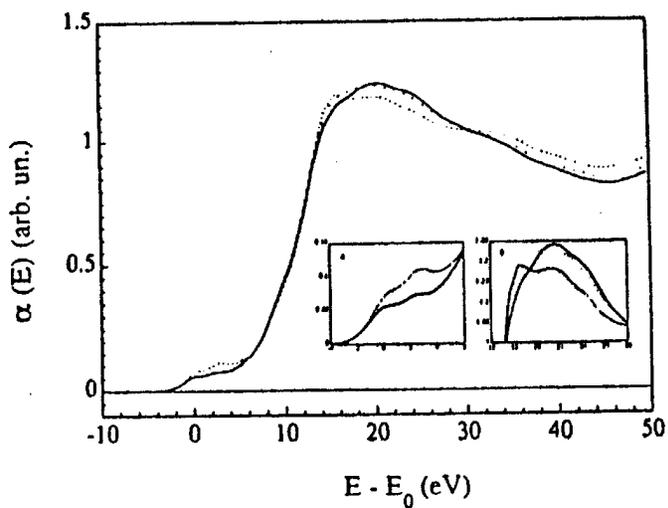


Fig. 1

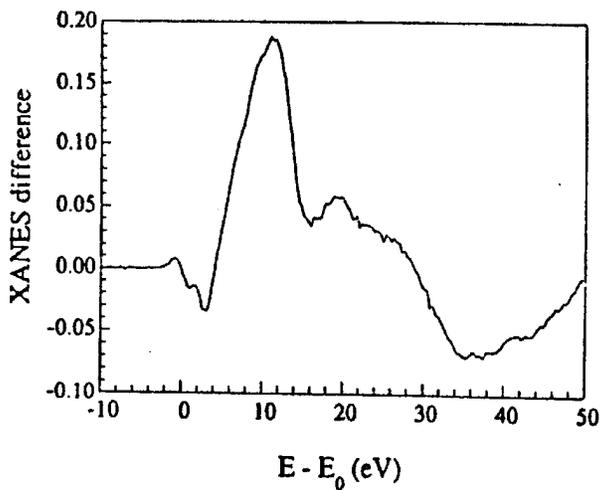


Fig. 2