ESRF	**Experiment title:** XSTRIP - A new detector for time-resolved EXAFS	**Experiment number**: MI-552
Beamline:	**Date of experiment**: from: 7th Nov 2001 to: 12th Nov 2001	**Date of report**: 1st Mar 2002
Shifts: 15	**Local contact(s)**: Sakura Pascarelli and Giuliana Aquilanti	*Received at ESRF:*

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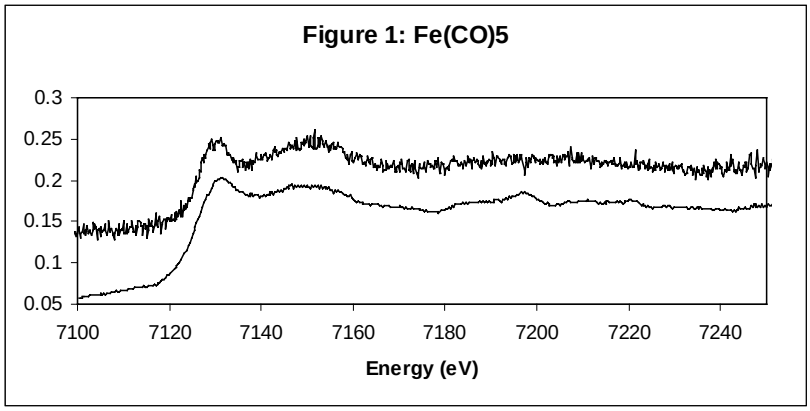
Report:

The final run in Nov was used to investigate a photolysis reaction of $Fe(CO)_5$ -- >$Fe(CO)_4$ in acetonitrile which has a lifetime of about 1ms before coordinating with MeCN and then excess CO in the solution. The ESRF Opotec Nd:YAG laser was used to excite the Fe with the 3rd harmonic at 355nm using a 4mJ pulse. A specially designed cell was used which offered an ideal 3mm absorption path length to the X-rays and perpendicular to this an ideal 200μm absorption path length for the UV light. A 20mM solution was allowed to flow from bottom to top using a syringe pump. Figure 1 shows a comparison between the CCD (top) and XSTRIP (bottom). Both spectra were collected for 9ms, the CCD 1 scan (1 stripe) of 9ms, XSTRIP 53 scans of 170μs. Due to the greater sensitivity of XSTRIP the signal to noise is improved by almost a factor of 10. In order to measure the 'active' and relaxed species the data were collected in 'XMCD' mode whereby the laser is

only fired every alternate run, thus allowing the unexcited data to act as a null spectrum. Unfortunately when it came to initiating the experiment with the laser, the combined effects of the small sample volume and heating from both the laser and X-ray beam produced small bubbles in the sample. Various avenues were pursued such as not saturating the solution in CO and reducing the power of the laser, but it was not possible to analysis time-resolved data with confidence. The quality of the data using XSTRIP though is remarkable, and it certainly shows that with the right sample it would be possible to measure spectra down to the nanosecond timescale just using a single bunch of X-rays.



Summary

The nickel and $Fe(CO)_5$ data showed that XSTRIP could operate with the full flux of an ESRF undulator (The highest X-ray flux was in 2 x 1/3 mode using 200mA, and the integration time with no sample before XSTRIP was 13μs, corresponding to $2.5x10^{12}$p/s. No radiation damage effects were noticed.) We wish to thank the ESRF for provision of beamtime.