

Microsecond time-resolved XAFS measurements at ODE beamline Synchrotron Soleil

Qingyu Kong, Jean Coquet, François Baudelet

Synchrotron Soleil, L'Orme des Merisiers St. Aubin, F- 91192 Gif-sur-Yvette, France

kong@synchrotron-soleil.fr

A time resolution of 1.25 microsecond (μs) was obtained for continuous XAFS data collection at ODE beamline Soleil Synchrotron, using the combination of the optical dispersive EXAFS setup and a fast detector (Gotthard PSI), which can be used for in-situ time-resolved XAFS study on electron transfer in electrochemical reaction, formation mechanism of nanoparticles,¹ and thermolysis reaction dynamics.² Continuously XAFS filming of photoreaction kinetics every 1.25 μs after a single laser pulse excitation is also developed at the beamline.

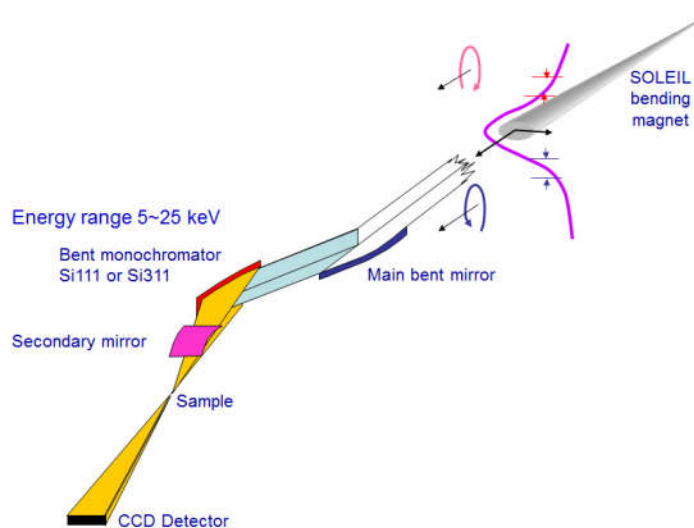


Figure 1. Schematic of optical dispersive EXAFS setup at ODE. A full EXAFS spectrum can be obtained with a single exposure to the position sensitive CCD detector.

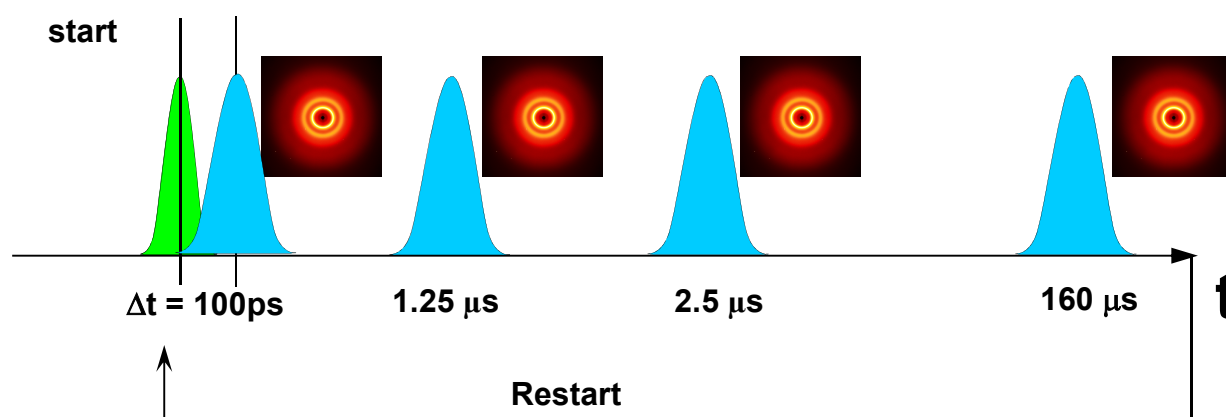


Figure 2. Continuous XAFS data collection every 1.25 μs using Gotthard detector. The trigger signal to start a chemical reaction could be a single laser pulse in photoreaction or a TTL electric pulse in electrochemical reaction.

References:

1. Abécassis B. et al. *Langmuir*, **2010**, 26, 13847.
2. Kong Q. Y. et al. *Sci. Rep.* **2012**, 2, 1018.