XAFS Beamline, BL01B1

XAFS Beamline (BL01B1) of SPring-8 has an experimental station for X-ray absorption fine structure (XAFS) spectroscopy in a wide energy region (3.8 to 113 keV), which covers *K*-edges from Ca to Bi, using its bending magnet radiation. The research activity of the beamline covers various research areas, such as materials, devices, catalysts, environments, biomolecules, and so on. The experimental station is equipped with a 19-element Ge detector and conversion electron yield detector, being capable of measuring XAFS spectra of thin films (thickness of 0.1 nm) and dilute samples (concentration of ppm). BL01B1 also makes it possible to perform *in-situ* time-resolved studies of chemical and physical reactions with quick scan XAFS technique. The time resolution is on the order of seconds to tens of seconds.

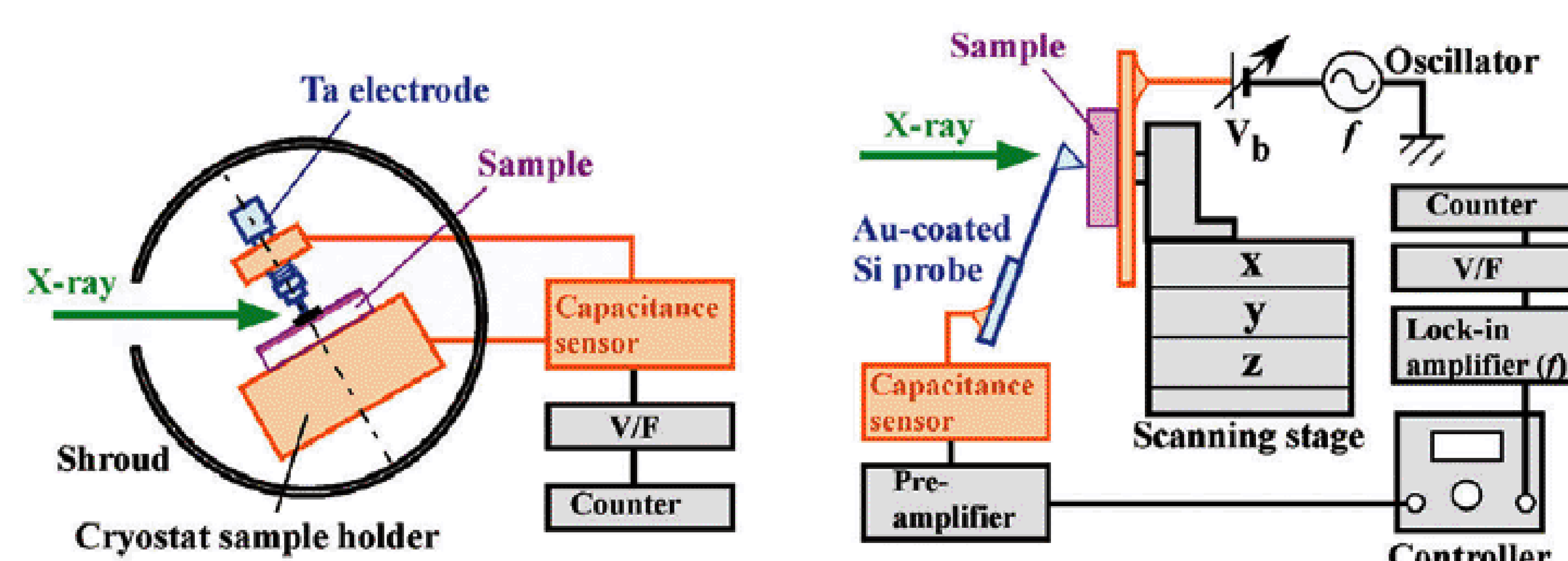
XAFS station at BL01B1

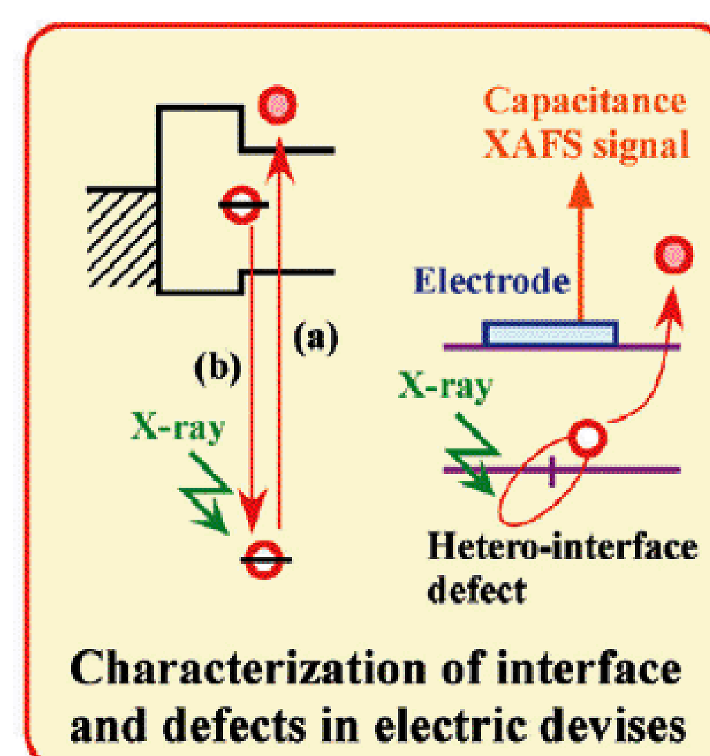
Capacitance XAFS Measurement

Capacitance XAFS, which is sensitive to specific sites in semiconductors, such as defects, interface and surface [1], is a novel XAFS measurement technique originally developed at SPring-8.

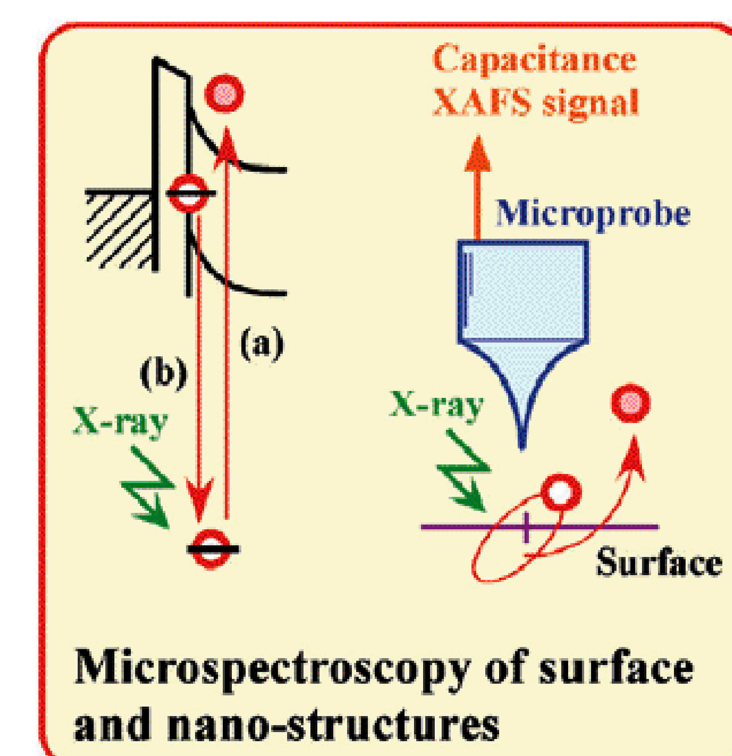
These sites intrinsically have localized electrons. Capacitance XAFS method probes a distinct electron transition process at these sites; X-ray absorption makes a core-hole through inner-shell excitation, and then the core-hole is refilled with the localized electrons. Interestingly, the capacitance probing can be applied for various types of instrument as follows.

1. Device-type: the capacitance XAFS method with the metal on semiconductor (MOS) capacitor structure reveals defect structures in the semiconductors, such as Sn doped AlGaAs semiconductor [2]. The MOS structure is widely used as the basic electric devices in LSI, indicating that the capacitance XAFS is directly applicable to the actual devices.
2. Scanning probe-type: a micro scanning probe with metal coating forms a micro capacitor on sample surface. The capacitance XAFS method with the micro capacitor realizes micro XAFS with nano-spatial resolution. This method identified local structure at interface between GaAs and its ultra thin oxide film [3]. The high spatial resolution XAFS measurement can be used as element identification and chemical state mapping.





Device-type



Scanning probe-type

(a) Inner-shell excitation and
(b) core-hole being refilled with localized electrons

[1] M. Ishii, Phys. Rev. B65, 085310 (2002).
[2] M. Ishii, Y. Yoshino, K. Takarabe and O. Shimomura, Appl. Phys. Lett. 74, 2672 (1999).
[3] M. Ishii, Jpn. J. Appl. Phys. 41, 4415 (2002).

HAXPES2006

The 2nd International Workshop on Hard X-ray Photoelectron Spectroscopy (HAXPES2006) will be held at SPring-8, from September 19 to 20, 2006,

http://haxpes2006.spring8.or.jp/

LEEM /PEEM-V

The 5th International Conference on LEEM/PEEM (LEEM/PEEM-V) will be held at the Egret Himeji, Hyogo, Japan, from October 15 to 19, 2006,

http://leem-peem-v.spring8.or.jp/