XAFS

X-ray Absorption Fine Structure (XAFS) is now part of the everyday tool kit of many scientists, and no longer just a pioneering research tool for a select few. Thus, many material, important to both basic science and industry have been studied by using XAFS in order to clarify the relationship between their function and the atomic and/or electronic structure. This technique has also been utilized to discover new ways to develop more effective materials. Such an example is the XAFS analysis of three-way catalysts used to remove harmful compounds from automobile exhaust. A study of GeO_2 phase transitions under high pressure is another example and shows the possibility of XAFS studies under extreme conditions.

Development of the XAFS method is in progress, continuing to extend the fields to which XAFS can be applied. Such an example is the application of "capacitance XAFS" to Se doped AlGaAs containing defects. Capacitance XAFS spectra clearly show the temperature dependence, not seen in fluorescent XAFS. These results, indicating the site-selectivity of capacitance XAFS, suggest that XAFS will become an important tool for the structural study of material such as semiconductors. The second example is a total reflection XAFS on the surface of solutions. With the help of the high brilliance of SPring-8 and recently developed phase plate techniques, the packings of surfactant molecules are clarified. The third is a combination of fluorescent analysis and XAFS by using microbeam X-rays. The spatial distribution and the nickel species remained in a diamond crystal was clarified.

The high brilliance of SPring-8 will make the today's frontier techniques routine ones in the near future, allowing the control of polarization and microbeam X-rays, to open new application fields for XAFS analyses in SPring-8.

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