15. UTILIZATION OF SYNCHROTRON RADIATION

15.3-1 ABSORPTION MEASUREMENTS OF Pb/Bi-SULFIDES CLOSE TO L-EDGES WITH SYNCHROTRON RADIATION. By V. Kupcik, M. Wendschuh-Josties, A. Wolf, R. Wulf, M. Wendschuh, A. Wolf and A. Paeblher, Nucl. Instr. and Methods (1983) 208, 519 pp in the Hamburg Synchrotron Radiation Laboratory at DESY.

A common problem in crystal structure analysis is the distinction of atoms with similar scattering power i.e. atomic number. Only in some special cases the different sites of the atoms can be derived from chemical arguments or examination of the coordination polyhedra. To overcome this principal difficulty a method called "Delta-Synthesis" is derived based on a difference Fourier synthesis calculated from two data sets measured at two different wavelengths. These two wavelengths have to be properly chosen on both sides of the absorption edge of the anomalous scatterer.

In connection with one of the research projects of our institute [structure analysis and physical properties of sulfosalts, (Me\textsuperscript{1} = Pb, Bi), Me\textsuperscript{2} = Sb, Bi], we are especially interested in determination of the Pb/Bi distribution in these compounds. Recent theoretical calculations on Lillianite (Pb\textsubscript{3}Bi\textsubscript{2}S\textsubscript{6}) and Galenobismuthite (PbBi\textsubscript{2}S\textsubscript{4}) (V. Kupcik, M. Wendschuh-Josties, A. Wolf, R. Wulf, HASYLAB Jahresbericht 1983) indicate that the method mentioned above is only valid if the correct values of the $f'$ and $f''$ components of the anomalous scatterers are known. So absorption-measurements at the L\textsubscript{III}-edge of Pb and Bi as well as on various Pb/Bi containing compounds have been carried out in order to study the change of the absorption curves due to the chemical composition. Knowing these wavelengths dependences the proper wavelengths for data collection can be chosen.

The measurements have been carried out on the 5-circle-diffractometer (V. Kupcik, R. Wulf, M. Wendschuh, A. Wolf and A. Paeblher, Nucl. Instr. and Methods (1983) 208, 519 pp) in the Hamburg Synchrotron Radiation Laboratory at DESY.