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THE SHORT OVERVIEW OF THE APPLICATIONS OF X-RAY ABSORPTION SPECTROSCOPY FOR MATERIAL CHARACTERIZATION AT INSTITUTE OF PHYSICS IN WARSAW

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The most important feature of the X-ray absorption spectroscopy is the elemental sensitivity that allows to separate structural information concerning a particular element in a multi-element compound even if the content of this element is very low and the system is disordered. The shape of the XANES spectra depends on the density of the unoccupied states in a given compound, and thus it can be considered as fingerprint of chemical bonds. The absorption edge energy can be correlated with charge transfer in the investigated element. In the case when a mixture of the several compounds containing the same element is present in the investigated sample, the analyzed spectrum is a weighted sum of the single-phase

spectra of these compounds. This can be used for quantitative estimation of the concentration of particular phases in a sample. The EXAFS oscillations are created in X-ray absorption process due to the scattering of internal photoelectrons on the neighbouring atoms, therefore, the analysis of these oscillations is a source of information on a short-range order in the samples. This is of particular value in the case of investigation of buried low dimensional structures, dopants in the semiconductors or biomaterials used in pharmacology or medical diagnosis and therapy. The examples of studies performed at several absorption stations at different synchrotrons will be presented.