

Trace Element Analysis with Synchrotron Radiation Challenges – Applications - Results

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Trace elements are chemical elements whose concentration in a material is very low. The exact definition depends on the application and varies for example between 100 micrograms per gram in analytical chemistry and 1000 micrograms per gram in geology. The ability to detect trace elements fast and quantitatively is of great importance in many areas of science and technology.

With its high brilliance and flexibility in the excitation conditions, synchrotron radiation is an ideal tool for detecting traces even in small sample quantities. In this contribution I will report about the use of X-ray fluorescence (XRF) for qualitative and quantitative element sensitive analysis. In addition to the fundamentals of XRF and its quantification methods, the advantages and problems of different geometries like e.g. micro XRF, Total Reflection X-ray Fluorescence (TXRF) or Double Dispersive XRF (D²XRF) will be discussed.

Practical examples from BAMline from the research fields of medicine, geology and archaeometry will complete the lecture.