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Neutron Activation Analysis at MLZ

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Neutron Activation Analysis is still one of the most sensitive trace-element analytical method. FRM II reactor offers unique possibilities for NAA with its high-flux highly thermalized neutron field. The method has been made available in the user system. The reactor is equipped with several irradiation facilities: rabbits, capsule irradiation system and the so-called “fishing line” position enabling the irradiation of materials in a broad mass and time range. Three HPGe detectors equipped with digital spectrometers are currently used for spectrum acquisition in the laboratory of the nearby building of the Radiochemistry Department (RCM). Data evaluation is based on the k_0 standardization method and is performed with HyperLab and Kayzero programs. A smart-controlled, list-mode-based acquisition of the gamma-ray spectra, as well as an automated sample changing are planned developments at the NAA instrument.

The scientific applications currently concentrate in the fields of archaeometry, cultural heritage, geology, cosmochemistry (meteorites), biology and food research, as well as recycling technologies. There is a particular demand for developments of new reference materials in archaeometry where NAA is to be used in their certification. FRM II reactor is also ideal for the determination of nuclear data, especially of more precise k_0 values serving the needs of nuclear analytical and data communities.

Primary author: Dr STIEGHORST, Christian (TUM / FRM II)

Co-author: REVAY, Zsolt (PGAA)

Presenter: Dr STIEGHORST, Christian (TUM / FRM II)

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