

Why elemental analysis is important in neutron scattering centers?

Thursday 22 June 2023 09:45 (15 minutes)

Elemental analysis with neutrons is based on the excitation of atomic nucleus inducing penetrant gamma rays, thus enabling the non-destructive bulk analysis of samples. With prompt gamma activation analysis (PGAA), all elements can be detected: the higher their neutron capture cross section, the stronger their signal in the gamma spectrum. It is unique in the determination of light elements (like H, B, also D), as well as in the characterization of neutron shielding.

We have received many inquiries regarding neutron activation analysis (NAA), our new instrument, as it is still one of the most sensitive method for trace elements (Co, Mn, Na, etc.), and is also important in the determination of activating nuclides in structural components.

PGAA has continuously been developed during the past 15 years with lowering the spectral background, with introducing new 64k digital spectrometers of great potential. We have introduced a low-background counting chamber for determining short-lived beam-activated nuclides. PGAA now also accommodates Neutron Depth Profiling with world-class characteristics.

We have more ambitious plans for the future: we want to detect all (detectable) particles induced by neutrons to reach a broader circle of elements with higher sensitivities (e.g., P in Si, Pb in bronzes, etc.). The combination of the methods (PGAA+NAA, short-cyclic NAA, PGAA+NDP, PGAA+imaging) open new directions, to which our user community is looking forward.

Primary author: Dr REVAY, Zsolt (PGAA)

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

Presenter: Dr REVAY, Zsolt (PGAA)

Session Classification: Parallel 5