New Trends in Neutron Activation Analysis in the Czech Republic: Capabilities of Low-Intensity Neutron Sources

Milan Stefanik, [1, 2, a)] and Lubomir Sklenka[1, b)]

[1] *Department of Nuclear Reactors, Faculty of Nuclear Sciences and Physical Engineering, Czech Technical University in Prague, V Holešovičkách 2, 18000 Praha 8, Czech Republic*
[2] *Nuclear Physics Institute of The Czech Academy of Sciences, p.r.i., Rez 130, Rez, 250 68, Czech Republic*

[a)] *Corresponding author: milan.stefanik@fjfi.cvut.cz*
[b)]*lubomir.sklenka@fjfi.cvut.cz*

Abstract. The contribution presents emerging trends in neutron activation analysis (NAA) in the Czech Republic, highlighting the innovative use of low-intensity neutron sources. In contrast to conventional high-flux facilities, NAA is successfully implemented at the very low-power Training Reactor VR-1 (80 W) at the Czech Technical University in Prague and successful pilot experiments were also carried out at accelerator-driven neutron sources NG-2 based on the U-120M cyclotron operated by the Nuclear Physics Institute of the Czech Academy of Sciences. Despite limited neutron flux, these facilities enable the analysis of diverse materials, including cultural heritage objects, environmental and biological samples, and advanced materials for energetics. Recent developments further demonstrate the potential of fast neutron activation analysis using proton-induced reactions on beryllium target. The results underline that low-intensity neutron sources represent a viable and flexible alternative for standard NAA at research nuclear reactors, offering new opportunities for interdisciplinary research, education, and applications with significant socioeconomic impact.