Recent upgrades of the external beamline at MIC

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Microanalytical Centre at the Reactor center Brinje is hosting a 2MV (mega volt) ion accelerator of the type Tandetron. With a few MV ion beam, various analytical techniques can be practiced, all covered in the term "Ion Beam Analysis (IBA)". At the external beamline, there is a continuity of using PIXE and PIGE analysis methods (proton induced X-ray and gamma-ray emission). RBS (Rutherford back scattering) method was added recently [1]. The RBS method provides complementary information about the depth profile of a target. Layers of heavy (high Z) elements on the light substrate can easily be detected and their thicknesses determined. For all IBA methods the amount of protons hitting the target (proton dose) is a key parameter, since normalization to the proton dose is obligatory for quantitative results. Two possibilities of measuring proton dose are available, a chopper intersecting the proton beam and a metal wire charge collecting device. Both of them have been added in the last year. With these upgrades at external beamline at MIC accuracy of the measurements has been improved and additional information about sample structure is now available. Latest research includes measuring of textile fibres for forensic applications[2], measuring of meteorite, fallen on Mežakla in April 2009, and analysis of Roman sword, found in the river Ljubljanica.

References:

[1] D. Jezeršek, Ž. Šmit, P. Pelicon, External beamline setup for plated target investigation, Nucl. Instr. and Meth. B, [Print ed.], 2010, vol. 268, no. 11/12, pp. 2006-2009.

[2] D. Jezeršek, S. Jakomin, Ž. Šmit, Analysis of textile fibers by in-air PIXE. Surf. interface anal., 2010, vol. 42, no. 5, pp. 423-428.