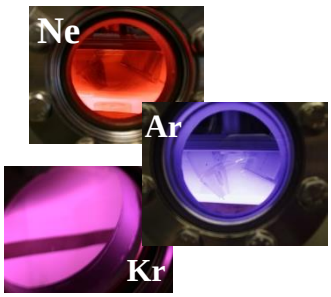
# Depth profile analysis of elemental distribution

## Preface

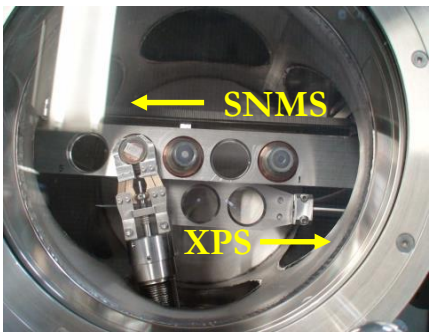
A Secondary Neutral Mass Spectrometer (SNMS, Specs GmbH) are used for depth profiling of layered structures and for detailed impurity analysis. It is possible to study conducting and insulating materials, depth profiling of scientific and industrial samples, identify impurity on the surface and inside of the samples structure. The controlled sputter removal of the surface by low energy ion bombardment , minimal matrix effects and no influence due to preferential sputtering allow very accurate material analysis.

## Infrastructure




Different type of plasmas are used as a source of ions for sputtering and as post-ionisation medium

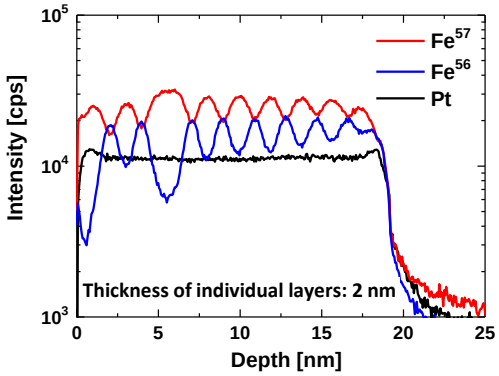
A complete quantitative analysis can be performed in order to determine the sample composition with high sensitivity (1 ppm) and depth resolution (~1 nm)



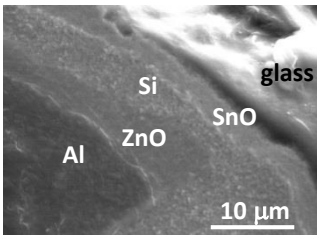

Mass analysis is performed by a quadrupole type mass spectrometer up to 340 amu

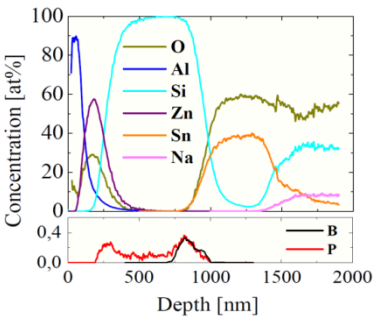
The common load-lock chamber to perform SNMS and X-Ray Photoelectron Spectroscopy (XPS) measurements without braking high vacuum

## Example

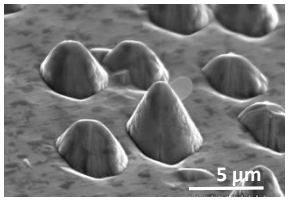



Identified layer thickness defect accrued during preparation of $Fe^{56}Pt/Fe^{57}Pt$ giant magnetic resistance (GMR) multilayers. This mistake in multilayer sequence fully destroyed the GMR property of the sample.




A solar cell structure: scanning electron microscope image different layers and depth profile of elements




Formation of array of hills on the PbTe surface during the sputtering process due to the re-deposition

*Contact: csik.attila@atomki.mta.hu*