Detect99

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THIN LAYER ANALYSIS

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ION BEAM ANALYSIS OF THIN LAYERS

Ion beam analysis (IBA)

Ion beam analysis techniques form a group of powerful methods to analyse the composition and thickness of thin films with thicknesses between sub-monolayer and micron(s). Techniques as RBS, ERD, NRA, PIXE and PIGE provide useful additions to techniques such as SIMS, AES, SEM-EDS, FTIR, XPS, etc. The results are easy to interpret and, in contrast to the results of many other techniques, unambiguously quantifiable.

IBA is ideal to determine elemental concentration depth profiles, contaminations and thickness in terms of at/cm2 and also the film density when the thickness in nm is known.

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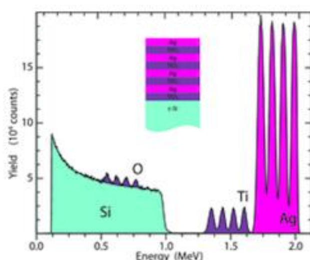
EXAMPLE RBS

A multi-layer consisting of 4 Ag/TiO2 bilayers on a Si substrate, as measured by RBS. The table below shows the RBS outcome.



layer	thickness 10^{15} at/cm^2	nm*
Ag (surface)	268	46.2
TiO_2	369	39.2
Ag	281	48.4
TiO_2	371	39.4
Ag	281	48.4
TiO_2	379	40.2
Ag	285	49.1
TiO_2	399	42.3

*) calculated *assuming* bulk densities

EXAMPLE ERD

Diffusion of H and D during annealing at 1100°C made visible with ERD: