Thin film depth profiling by ion beam analysis: a comparison to other analytical techniques

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The analysis of thin films is of central importance for functional materials, including the very large and active field of nanomaterials. Quantitative elemental depth profiling is often of primary interest, and many analytical techniques are widely available, but all have limitations and quantitation is always an issue.

The essentials of IBA techniques as well as the illustration of their analytical capabilities through practical examples are the subject of the previous tutorials. Here, we will focus first to the great interest of synergistically and effectively combining the quite different information available from the atomic (PIXE) and nuclear (RBS, ERD, NRA) methods (i.e. the so-called Total-IBA). Then, we will go through a set of examples selected from the literature to highlight the strengths and weaknesses as well as the complementarity of the Total-IBA method to other analytical techniques such as XRF, (ToF)-SIMS, XPS, ICP-MS, GDOES…