

Time-of-Flight Secondary Ion Mass Spectrometry TOF-SIMS

Introduction

TOF-SIMS is a very sensitive surface analytical technique. It provides detailed elemental and molecular information about surfaces, thin layers, interfaces, and full three-dimensional analysis of the samples. ToF-SIMS technique is used in different areas including semiconductors, polymers, paint, coatings, glass ceramic, metals biomaterials, and pharmaceuticals. The TOF.SIMS 5 is the high-end TOF-SIMS instrument developed over the last 20 years. Its design guarantees optimum performance in all fields of SIMS applications.

Unique features of the TOF.SIMS 5 are:

- Ultra high sensitivity for molecular species by optimised cluster ion sources
- Outstanding performance for low energy depth profiling
- Sophisticated software for ease of operation and data handling
- Modular construction for configuration and upgrade flexibility
- Ergonomic design with compact footprint



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Technical Specifications

A two meter reflectron type TOF analyzer with first order energy focusing, an Einzel lens for secondary ion beam transportation, a beam deflector for alignment and dynamic emittance matching, secondary ion beam blanking allowing for repetition rates up to 50 kHz, 10 kV post-acceleration optics, a combined microchannel plate (MCP), scintillator and photomultiplier ion detector, and a multi-stop time-to-digital converter (TDC) with 50 ps time resolution.

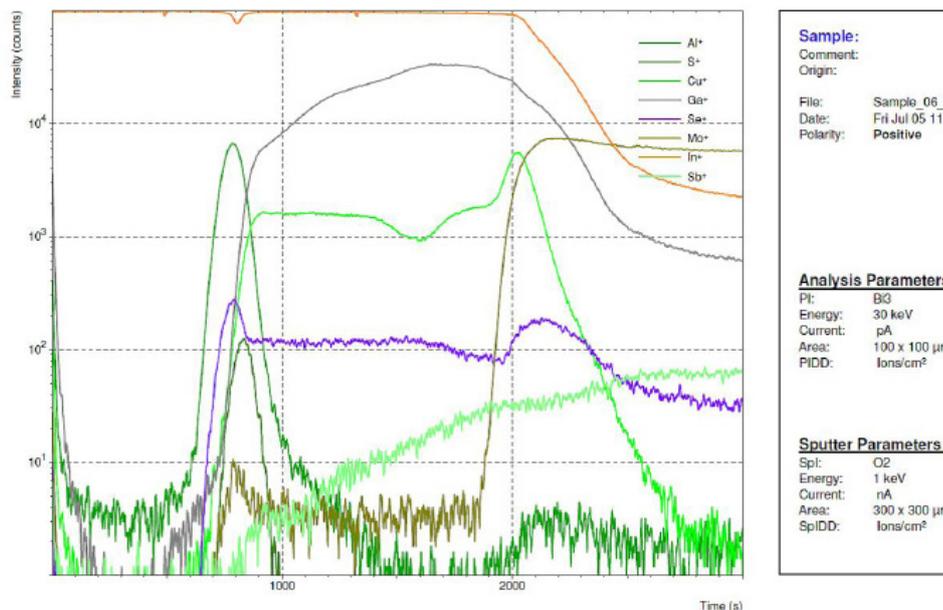
A rapid 100-mm-sample introduction system and two multiple sample holders with rear mounting for samples up to 8 mm thick and top mounting for samples up to 20 mm thick. Full access to all sample surfaces by movement of the stage.

A motorized five-axes UHV sample stage with large travel (X = 90 mm, Y = 125 mm, Z = 25 mm, tilt = -15° to +45°, and endless rotation).

A self-adjusting charge compensation system using a low energy electron flood gun synchronized with ion gun pulsing to neutralize the positive charge after each ion pulse.

A 30 keV, three-lens BiMn cluster ion gun. This cluster Liquid Metal ion Gun (LMIG) is ideally suited for high lateral resolution microanalysis and imaging as well as high mass resolution surface spectroscopy.

A high current ion optical column (dual source column) to which two ion sources, an electron impact ion source (EI SOURCE) and a thermal ionization Cesium ion source are fitted. This column is used for ultra-low energy sputtering in dual beam depth profiling.



Illustrative examples of work undertaken at MSSSI: Dual beam depth profiling of the prototype solar cell.



Ireland's EU Structural Funds Programmes 2007 - 2013
Co-funded by the Irish Government and the European Union



EUROPEAN REGIONAL DEVELOPMENT FUND



An Roinn Post, Fiontar agus Nuálaíochta
Department of Jobs, Enterprise and Innovation



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