Tof-SIMS^5

Time-of-Flight Secondary Ion Mass Spectrometry

Grupo de Investigación sobre Adhesión Microbiana AM-UEX

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Infrastructure for the Production and Characterization of Nanomaterials, Biomaterials and Systems in Biomedicine

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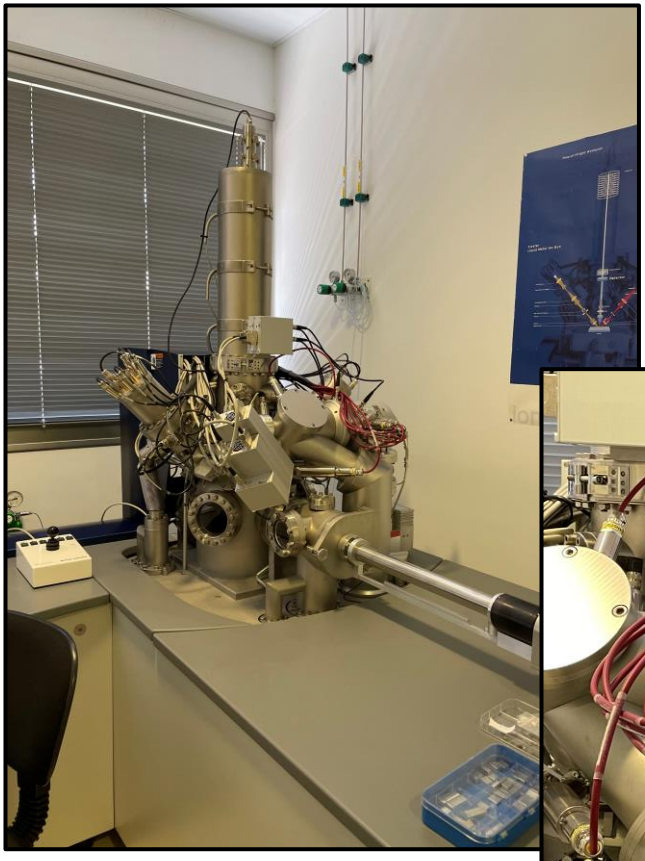

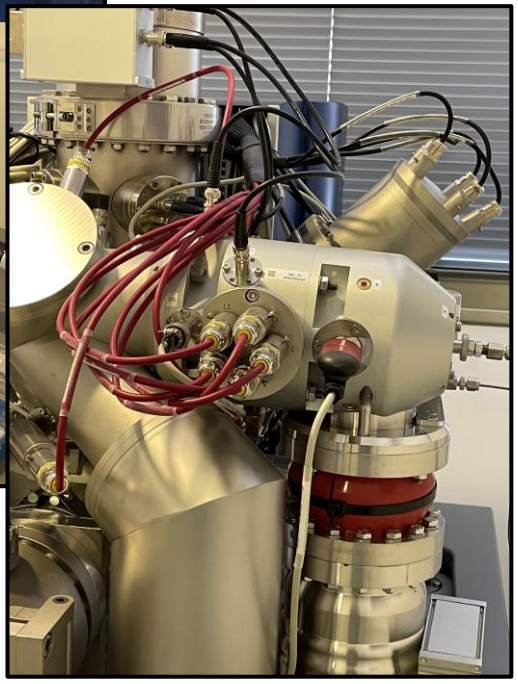

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Tof-SIMs

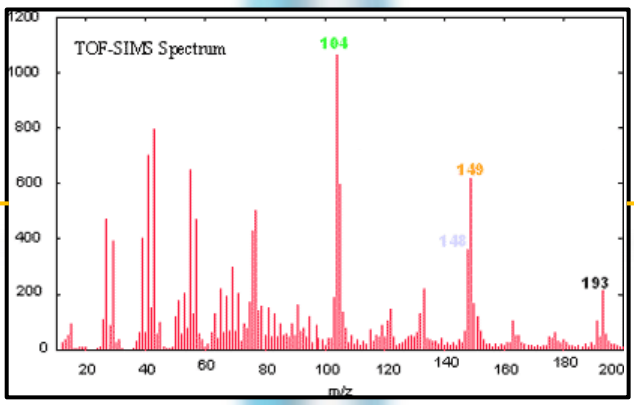
Time-of-flight secondary ion mass spectrometry (TOF-SIMS) is a highly sensitive surface analytical technique, and its use is well established in many industrial and research applications.

It provides detailed elemental and molecular information of surfaces, thin films and interfaces at both surface and 3D levels.

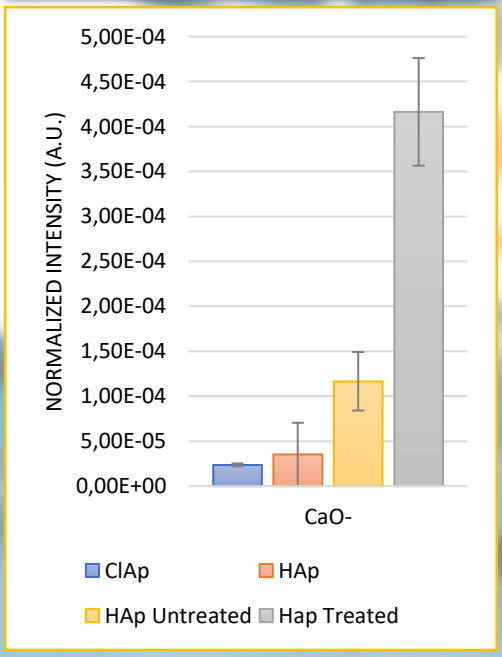
It is widely used for the characterization of semiconductors, polymers, paints, coatings, glass, paper, metals, ceramics, biomaterials, pharmaceuticals, etc.

Surface measurements

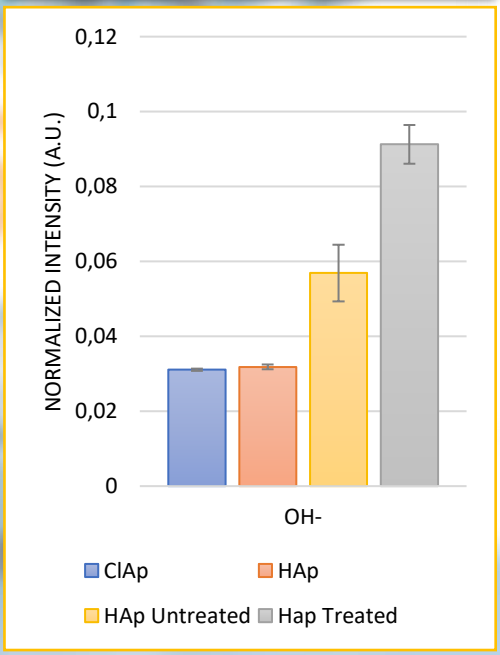
Composition of thin film coatings on a metal by analysis of extracted ions.



CALCIUM [CaO^-]

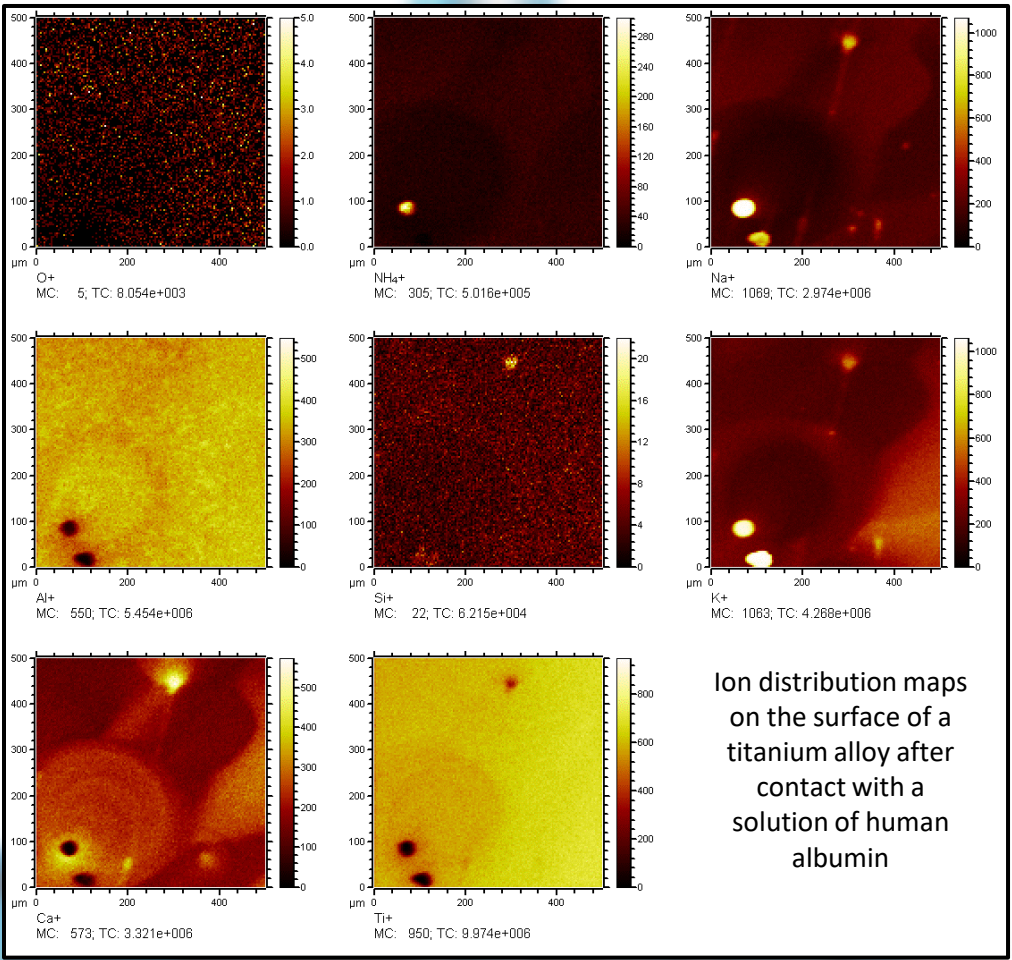


HYDROXY [OH^-]



Ion mapping

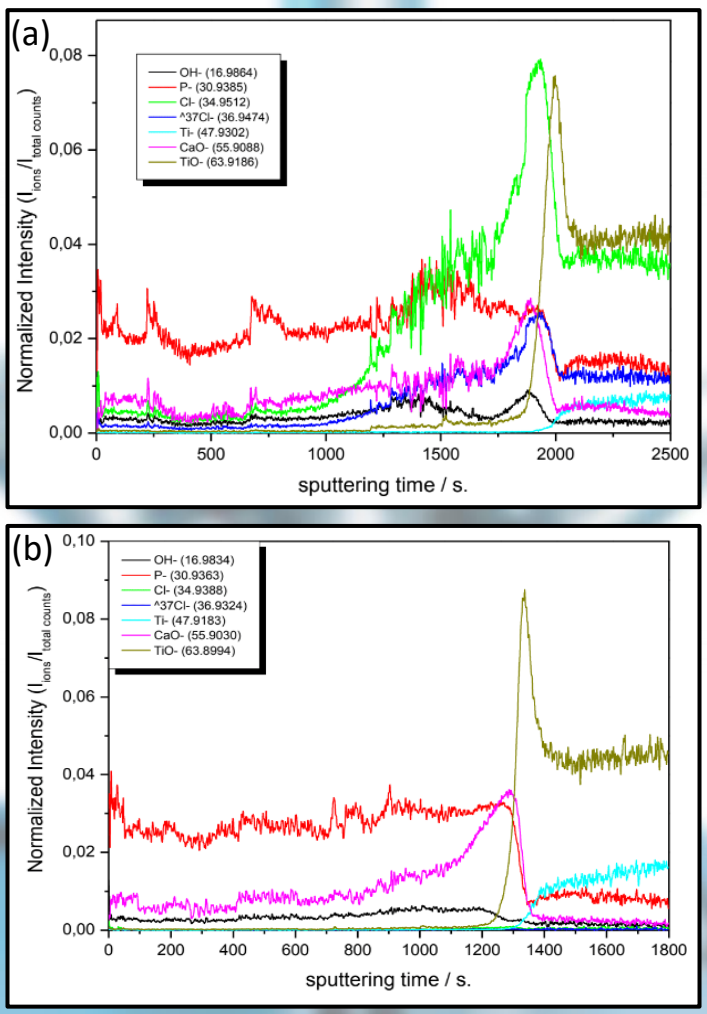
It allows the construction of surface **ion distribution maps**.



Ion distribution maps on the surface of a titanium alloy after contact with a solution of human albumin

Depth profiles

Evaluation of the composition of a coating at different depths: Collecting ions from **progressively deeper levels** of the coating allows the reconstruction of the layers that make up the coating.

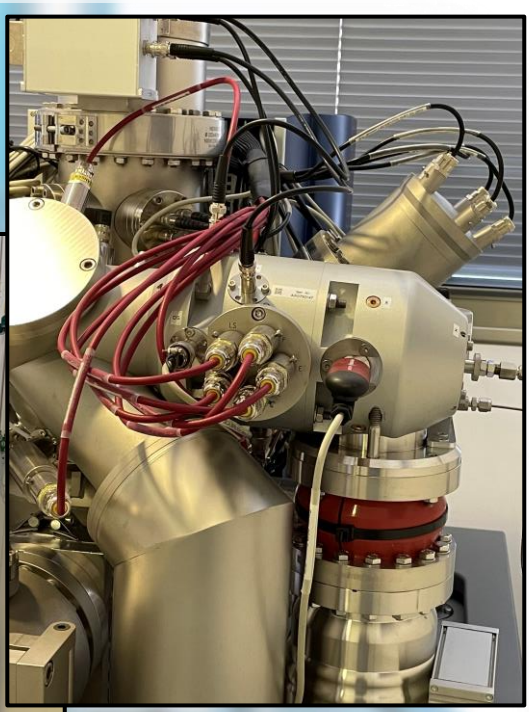


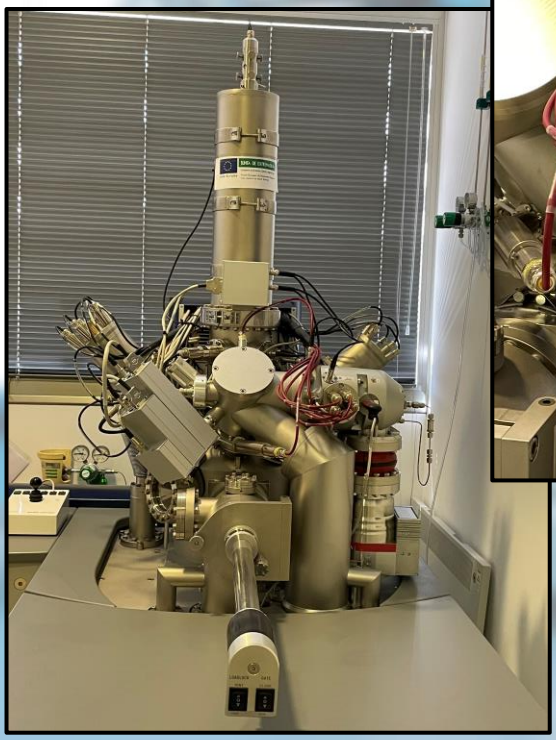
Depth profile of coatings of (a) Chlorapatite and (b) Hydroxyapatite on titanium

Argon cluster ion beam

Primary gun that allows working at very **low energy** intervals, facilitating a bombardment and extraction of ions with minimal surface disturbance, thanks to a lower fragmentation of ions at surface and at depth.

These conditions are excellent for SIMS measurements on organic materials, SAMs, polymer films, protein systems, biomaterials, etc.





Technical specifications

TOF-SIMS[5] (Time Of Flight Secondary Ions Mass Spectrometer)

Primary ion beam:

1. Sputtering by Bi ions with intensities of: Bi^{+} (1.2 pA), Bi^{3+} (0.3 pA) y Bi^{3++} (0.2 pA).
2. Argon cluster

Sputtering gun: Oxygen (Positive ion detection) or Cesium (Negative ion detection).
Sputtering energies: 250, 500, 1000 o 2000 eV.
Ion cannon and sputtering located at 45° to the horizontal.
Detectable mass range: 0 to 12000 a.m.u.
Lateral resolution: 130 nm to 5 µm.
Mass resolution: 100 ns.
Measuring spot size: 10 – 500 µm in square arrangement.

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Rates

Service	UEX/CIBER	Public Organizations	Private Companies
Hour of use, no sputtering (1st hour)	40 €	100 €	200 €
Extra hour of use, no sputtering (in excess after 1st and up to 6 h)	20 €	50 €	100 €
Experiments lasting longer than 7 h without sputtering	200 €/day	500 €/day	1000 €/day
Sputtering	5 €/hour	12.5 €/hour	25 €/hour
Sputtering day	50 €	125 €	250 €
Sample preparation, suitability, test design and reporting data	15 €	40 €	80 €
Technician time	15 €	40 €	80 €

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