Introduction
SUS 316L stainless steel, CoCrMo alloys or Ti alloys (TiAlNb notably) are metallic bio compatible materials commonly used for implants. Coatings and surface treatments of these alloys are developed to enhance their tribological properties. Synthetic Hydroxiapatite (Hap) is also used as biomaterials for many applications because it forms a real bond with the surrounding bone tissue when implanted. Nanoparticles of Ag notably known for their antibacterial effect are also often added to the surface treatments.

Research on these materials and coatings is very active and pulsed RF GDOES is used by several groups as presentations of the last GD days reveal (talk of R. Escobar in 2012, talk of E Marin and talk of S Iconaru in 2014 – to name a few. See also the papers listed in reference [1-4])

Instrumentation
The GD Profiler 2 instrument provides fast elemental depth profile of coatings and materials used for biomedical applications. It relies on the sputtering of a representative area of the investigated sample by a plasma. The same plasma assures the excitation of the sputtered species, representative light being measured by a fast, high resolution optical spectrometer.

All elements of interest can be simultaneously measured (including P, O, Ag, Ca, H, etc) with high sensitivity (usually better than SEM/EDX).

The depth resolution of the technique depends on the roughness of the analyzed substrate and can be as good as 1nm.

Pulsed RF operation assures that conductive and non conductive materials can be equally measured.

Abstract
Some GD results on biocompatible materials are presented and the interest of the technique in this field is explained.

Key words
Bio materials, Ag nanoparticles, Implant devices, HAp coatings
Examples of results

2 illustrating results are shown here, taken from the presentation of R. Escobar at the 2012 GD day and S Iconaru at the 2014 GD day.

Conclusions

Pulsed RF GDOES could be of great help for the development and characterization of bio-compatible coatings and materials. Horiba Scientific with several application laboratories implanted world-wide could help for the research and development towards a healthier world.

References


