

Surface modification by low energy multiply charged ion beam implantation



Preface

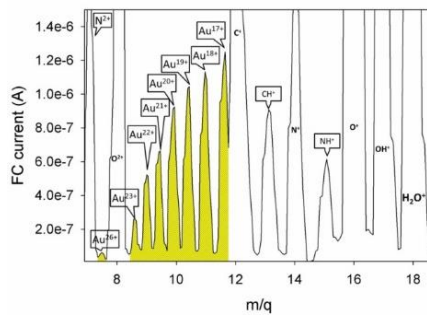
Low energy multiply charged ions (e. g. Si, Ca, Au, Ag) are possible to be generated by Electron Cyclotron Resonance Ion Source (ECRIS) in order to modify the material's surfaces (e.g. Titanium, Zirconia) on nanoscale, to obtain functional surfaces of implants and restorations. Irradiation chamber is developed to implant the ions in a controlled and effective way.

Atomki ECR Ion Source

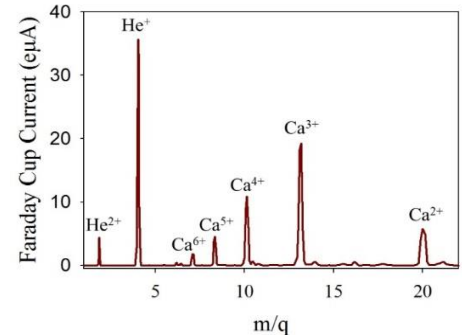
Infrastructure



Gold ion beam spectra



Calcium ion beam spectra

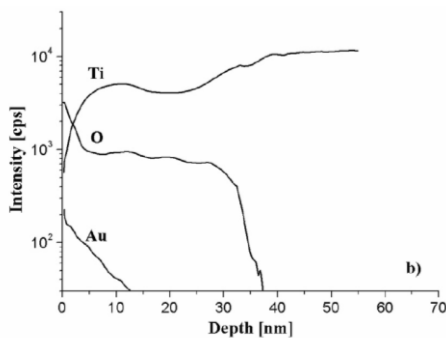


Implantation depth is possible to be varied by the kinetic energy of the ions by changing the platform voltage of the ion source (50 V – 30 kV)

Example

TiO was irradiated by multiply charged Au ions with 27 keV average kinetic energy. Dose: $2 \cdot 10^{15}$ ion/cm²

Depth distribution of the ions is measured by Secondary Neutral Mass Spectrometry (SNMS) and simulated by Monte Carlo (MC) codes.



Depth profile:

Measured by SNMS



Calculated by MC code

