**An Inverted Cylindrical Sputter Magnetron as Metal Vapor Supply for ECR Ion Sources**

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High current metal ion sources are utilized for large surface irradiation and implantation such as in semiconductor, medical or optical industry. For this purpose, a new ion source prototype was developed, which combines magnetron sputter technology with ECR ion source technology – a so called magnetron ECR ion source - MECRIS. In this an inverted cylindrical magnetron sputter device is acting as a metal atom source. The MECRIS is working at 2.45 GHz microwave frequency and it is designed to provide metal ions with energies of up to 30 keV at a beam current of about 20 mA. MECRIS technology is representing a new approach to produce high intensity metal ion beams, covering a wide range of elements. In principal, there is no limitation to the cathode material, and hence to the extractable metal ion species. Prove of principal experiments were carried out with an Al sputter target. The talk will give an overview of solutions that had to be found for a proper combination of magnetron sputter technology and ECR ion source technology as well as first experimental results concerning magnetron operation at ECR magnetic mirror field conditions. Optical spectroscopy and Langmuir probe measurements show an increase in electron density by one order of magnitude, when the magnetron is operated within the ECR ion source magnetic mirror field. Electron density enhancement is also indicated by magnetron plasma emission photography with a CCD camera. Furthermore, photographs visualize the formation of a localized loss-cone-area, when the magnetron is operated at magnetic mirror field conditions. The magnetron supplies a metal atom load rate of at least 1E18 atoms/s for Al, which is necessary to produce a milliamp Al\(^+\)- ion beam.

**Keywords**

- high current metal ion beam
- ECR ion source implantation
- large area