Hiden Reference: AP0067
Hiden Product: ESPion Langmuir Probe

O- density measurements in the pulsed-DC reactive magnetron sputtering of titanium

The importance of electronegative species in technological plasmas is currently of great interest, both from a theoretical and experimental point of view, with much of the recent work concentrating on reactive ion etching discharges.

However, other very important plasma systems have been somewhat neglected by scientist and engineers in terms of the role of negative ions, for instance, pulsed magnetized discharges (the sputter magnetron) used for the reactive deposition of thin films which contain electronegative gases such as oxygen.

In this project, we have made the first detailed study of the time-evolution of the density of negative ions in pulsed reactive magnetron plasmas (Ar/O_2) and their effect on the structure and dynamics of the plasma itself. The main negative ion species we observe close to the substrate is O^- with densities approaching the electron density in the pulse on time, but with densities much greater than the electron density when the off-times are greater than about 50 µs. About 105 of the total O- density are very energetic, with energies up to the equivalent of the cathode target potential. The results are useful in understanding thin film growth dynamics and the fundamental data can be used in other more surface engineering orientated projects.

Here is a photo of the system and picture of the Langmuir probe in the Ar/O_2 plasma with a titanium target.

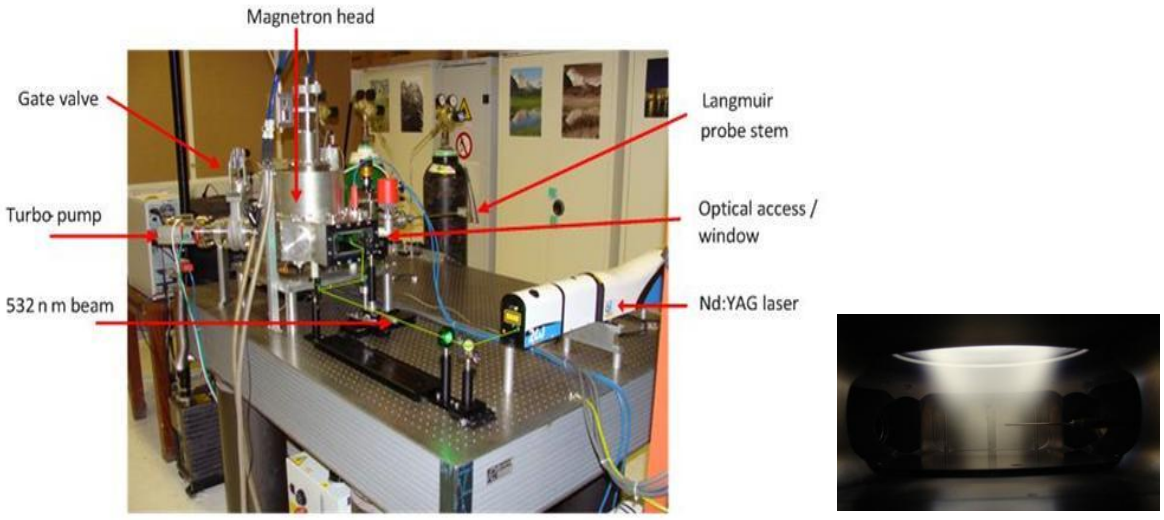

Photo of the system and picture of the Hiden ESPion Langmuir Probe in the Ar/O_2 plasma with a titanium target

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Hiden Product:
ESPion Langmuir Probe
Follow the link to the product catalogue on our website for further information:
http://www.hidenanalytical.com/index.php/en/product-catalog/51-plasma-characterisation/80-hiden-espion-advanced-langmuir-probe-for-plasma-diagnostics