

Microwave Interferometer MWI 2650



Fig. 1: MWI 2650

Electron release in the afterglow of a pulsed inductively-coupled radiofrequency oxygen plasma

May 2006

The work described below was performed using a JE PlasmaConsult MWI 2650 microwave interferometer.

A. Brockhaus, G. F. Leu, V. Selenin, Kh. Tarnev¹ and J. Engemann

Forschungszentrum für Mikrostrukturtechnik - *fmt*, University of Wuppertal, Rainer-Gruenter-Straße, 42119 Wuppertal, Germany

¹ On leave from the Technical University Sofia, Bulgaria.

Abstract

A pulsed inductively-coupled radio-frequency plasma in oxygen is investigated by means of time-resolved microwave interferometry in a wide pressure range from 0.5 to 200 Pa. In the afterglow a peak of the electron density is observed. The effect is

maximum for pressures around 50 Pa. The time-resolved measurements of the electron density are interpreted in the framework of a fluid model. This model points out the significance of negative ions. The overall electron density is comparatively small. Attachment and detachment processes nearly balance during the power-on phase. But when the power is switched off, the electron temperature drops very quickly. This means that the production of new negative ions is inhibited so that the negative ions are destroyed by collisions. These reactions quickly set free electrons in the afterglow and are the reason for the observed peak in the electron density after switching off the power.

Plasma Sources Sci. Technol. **15**, 171-177 (2006)

Copyright © Institute of Physics and IOP Publishing Limited 2007.

For further information please contact:

Plasma Consult

JE PlasmaConsult GmbH
Rainer-Gruenter-Str. 21, Geb. FN
42119 Wuppertal
Germany

Tel. ++49-202-28397-0
Fax ++49-202-28397-123

contact@plasmaconsult.de
www.plasmaconsult.com