Abstract Submitted
for the GEC05 Meeting of
The American Physical Society

Negative Ions in Rare Gas/Oxygen Discharges[1] M. KATSCH, A. WAGNER, Universitaet Duisburg-Essen — The temporal behavior of negative oxygen ions in argon-, krypton- and neon/oxygen mixtures is investigated in a pulsed inductively excited GEC reactor. The negative ion densities are measured by laser photodetachment of negative ions in combination with a Langmuir probe. In the early afterglow an unexpected high density of negative oxygen ions is found in mixtures with a high content of rare gas. These findings are in contrast to the predictions of our global model. It is, therefore, necessary to invoke an additional production channel for the negative ions, in order to explain the observed high negative ion density. It is likely that additional negative ions are generated by dissociative attachment of highly excited oxygen molecules. It is also possible that Rydberg states of the oxygen molecules are excited via collisions with metastable rare gas atoms. These excited Rydberg molecules may also lead to a generation of negative oxygen ions. Comparative measurements show that it is unlikely that Rydberg states are responsible for the enhanced generation of negative ions.

[1]Supported by the "DFG" (SFB 591)

M. Katsch
Universitaet Duisburg-Essen

Date submitted: 06 Jun 2005 Electronic form version 1.4