Abstract Submitted
for the GEC10 Meeting of
The American Physical Society

Capacitively coupled radio-frequency discharges in nitrogen at low-pressure[1] L.L. ALVES, L. MARQUES, C.D. PINTASSILGO, IPFN-LA/IST, Portugal, G. WATTIEAUX, J. BERNDT, L. BOUFENDI, GREMI/CNRS, France, G. CERNOGORA, LATMOS-UVSQ/CNRS, France — This paper uses simulations and measurements to study capacitively coupled rf discharges (13.56 MHz) in pure nitrogen, produced within a cylindrical parallel-plate reactor, at 0.2-2 mbar pressures and 20 -30 W coupled powers. The reactor is similar to a GEC reference cell surrounded by a lateral grounded grid. Simulations use an hybrid code that couples a 2D (r,z) time-dependent fluid module, describing the dynamics of charged particles, and a 0D kinetic module, describing the production and destruction of nitrogen (atomic and molecular) neutral species. The coupling between these modules adopts the local mean energy approximation to define space-time dependent electron parameters for the fluid code and to work-out space-time average rates for the kinetic code. Model results are compared to measurements of the self-bias potential, the effective rf power (accounting for circuit losses), the average electron density (obtained by resonant-cavity measurements), and the intensities of radiative transitions with the nitrogen SPS and with atomic lines emitted by argon traces (obtained by OES diagnostics).

[1]Work supported by a PICS Cooperation Program (FCT-CNRS)

L.L. Alves
IPFN-LA/IST

Date submitted: 11 Jun 2010 Electronic form version 1.4