Abstract Submitted
for the GEC16 Meeting of
The American Physical Society

Semi-analytical description of arbitrary electron energy distribution function for non-kinetic models WLADISLAW DOBRYGIN, OLIVER SCHMIDT, Dep. for Functional Materials and Coating Technologies, Robert Bosch GmbH, D-70465 Stuttgart, Germany, RALF PETER BRINKMANN, Institute of Theoretical Electrical Engineering, Ruhr University Bochum, Germany — An efficient way to study chemistry and fundamental processes of plasmas is a global (volume averaged) chemical model. The process conditions (absorbed power, pressure), the plasma chemistry and the shape of electron energy distribution function (EEDF) are the crucial model input parameters. Langmuir probe measurements of EEDF in very well-known reactors like ICP shows non-maxwellian distributions[1]. In order to solve the global models of this kind of plasmas without solving a Boltzmann-equation, the EEDF with parametric mean energy have to be described by an analytic function (i.e. Maxwell- or Druyvesteyn distribution). If the EEDF has a convex shape, Druyvesteyn-like distributions with modified exponent x can be used [2] but others such as the bi-Maxwellian distribution cannot. In this work, we show a way to represent an arbitrary EEDF using a semi-analytical function which allows us to variate the mean energy of the EEDF. The EEDF shape is given from Langmuir probe measurement. The validation will be shown in calculations of low pressure ICP discharge in Argon and Acetylene chemistry.

[1] V. A. Godyak et al., Plasma Sources Sci. Technol. **11** 525-543 (2002)
[2] J. T. Gudmundsson, Plasma Sources Sci. Technol. **10** 76-81 (2001)

Wladislaw Dobrygin
Dep. for Functional Materials and Coating Technologies, Robert Bosch GmbH, D-70465 Stuttgart, Germany

Date submitted: 10 Jun 2016 Electronic form version 1.4