Abstract Submitted
for the GEC10 Meeting of
The American Physical Society

Dust Formation in a DC discharge ARMELLE MICHAU, GUILLAUME LOMBARDI, LIMHP CNRS, CÉCILE ARNAS, PIIM CNRS, XAVIER BONNIN, KHALED HASSOUNI, LIMHP CNRS — Evidences of nanostrucutred dust particles in thermonuclear fusion rector with carbon-facing components have been reported [1]. This formation may be due to some parasitic plasmas observed in fusion reactors. The formation of particles in such conditions is investigated here using a simple laboratory DC electrical discharge. We make use of a numerical model to analyze the formation of dust through cathode sputtering and subsequent molecular growth in this discharge. The model developed for this study includes three modules. The first one describes the DC discharge in a dust-free plasma with a Monte-Carlo simulation combined with an analytical discharge models.. These profiles are then used as input data for the modules that describe growth and transport of carbon clusters and particle in the discharge column [2]. The model developed takes into account neutral and negative carbon clusters. The largest molecular edifice is assumed to give rise to spontaneous nucleation of solid particles. The third plasma module solves fort he dust total density, average mass and average charge. The average particle charging is described by a detailed charge balance where a fluctuation of the dust is also considered.

[1] V. Rohde, et al., J. Nucl. Mater. 313-316 (2003) 337.
[2] J. Bernholc, J. C. Phillips, J. Chem. Phys. 85(6, 258-3267(1986)

Armelle Michau
LIMHP CNRS

Date submitted: 11 Jun 2010 Electronic form version 1.4