Abstract Submitted
for the GEC10 Meeting of
The American Physical Society

Prospects of dielectric barrier discharge (DBD) in medical application: Investigation through plasma characterization P. RAJASEKARAN, P. MERTMANN, N. BIBINOV, P. AWAKOWICZ, Ruhr-University Bochum, GER, D. WANDKE, CINOGY GmbH, GER, W. VIOEL, University of App. Sci. and Arts, Goettingen, GER — A DBD device capable of generating plasma on human body is studied for medical therapy of skin. The device comprises of a ceramic-covered electrode driven by a 13 kV pulsed power supply at 300 Hz trigger frequency. When breakdown conditions are satisfied, discharge is ignited in ambient air between the working electrode and the treated substrate, which serves as the opposite electrode in this case. Biologically-reactive molecules like nitric oxide (NO) and ozone are produced due to plasma-chemical processes in the active plasma region. These molecules can be useful for treatment of wounds and skin diseases. The flux of NO and ozone reaching the treated surface is determined with the help of plasma characterization. We characterize the plasma through determination of gas temperature and plasma parameters like electron density and electron velocity distribution function (EVDF), using experimental methods namely optical emission spectroscopy (OES), current-voltage measurements, microphotography and numerical simulation. Using the determined parameters, flux of NO, ozone and UV photons reaching the treated surface is simulated. The simulation results are compared with other sources applied in similar medical application.

Priyadarshini Rajasekaran
Institute for Plasma Technology, Ruhr-University Bochum, Germany

Date submitted: 14 Jun 2010 Electronic form version 1.4