Abstract Submitted
for the GEC14 Meeting of
The American Physical Society

Atomic oxygen characteristics in a dielectric barrier discharge developed for wound treatment[1] SABRINA BALDUS, Institute for Plasma Technology, Ruhr University Bochum, DANIEL SCHROEDER, VOLKER SCHULZ-VON DER GATHEN, Institute for Experimental Physics II, Ruhr University Bochum, NIKITA BIBINOV, PETER AWAKOWICZ, Institute for Plasma Technology, Ruhr University Bochum — Nowadays, infected chronic wounds are a major problem of society. Atmospheric pressure plasmas like dielectric barrier discharges (DBDs) have already shown their ability of improving the wound healing process of chronic wounds in clinical trials. Yet, the mechanism of action is poorly understood. A DBD comprising a single driven electrode is a beneficial configuration for wound treatment. The patient itself functions as the counter electrode. Hence, reactive oxygen species (ROS) like ozone or atomic oxygen produced in the plasma reach the wound directly. Some ROS, including superoxide or nitric oxide, are produced by skin cells to repulse invading bacteria. Nevertheless, a very high amount of ROS leads to oxidative stress and can cause cell damage or even cell death. Therefore it is crucial to have a well characterized plasma for effective wound treatment. Plasma parameters are determined using absolutely calibrated optical emission spectroscopy. Density of atomic oxygen is measured applying xenon-calibrated two photon absorption laser induced fluorescence spectroscopy. A simulation of the afterglow chemistry, developed to gain insight in the characteristics of the atomic oxygen and its flux towards the treated surface, is cross-checked with measurement results.

[1]Work supported by the German Research Foundation within PAK816.

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Date submitted: 12 Jun 2014 Electronic form version 1.4