Abstract Submitted
for the GEC10 Meeting of
The American Physical Society

Pulsed corona oxidation of low NO and NO_2 concentrations: semi-industrial tests and model simulations to illustrate the process
E.A. FILIMONOVA, Joint Institute for High Temperatures of RAS, Moscow, Russia, F.J.C.M. BECKERS, HMVT B.V., Ede, Netherlands, E.J.M. VAN HEESCH, W.F.L.M. HOEBEN, A.J.M. PEMEN, Eindhoven University of Technology, Eindhoven, Netherlands — Conventional NO_xremoval technologies are complex and require high temperature and large quantities of additives or absorbents. The plasma driven process is less complex, runs at ambient temperature, needs no additives and handles large flows. However, plasma technology has not yet been developed to industrial scale due to challenges of reliable pulsed power generation and efficient reactor technology. We present results of tests at semi-industrial scale accompanied by computer simulations, to illustrate the analysis of the reactor process. The pollutant source is a diluted exhaust flow of a 15 kW Diesel engine. NO_x input to the reactor is 30 ppm. The reactor is a 500 liter multiple-plate saw-blade structure fed by a 100 ns pulse source of 5 kW maximum average power. The computer model of removal process takes into account processes of chemical kinetics, diffusion outside and inside of streamer traces during multi-pulsed treatment and continued conversion in the inactive volume between reactor and point of gas sampling. Results show fair agreement between measured and simulated data of NO, NO_2 and O_3. HNO_2, HNO_3 production is shown as the completion of the process.

E.A. Filimonova
Joint Institute for High Temperatures of RAS, Moscow, Russia

Date submitted: 10 Jun 2010 Electronic form version 1.4