Abstract Submitted
for the GEC16 Meeting of
The American Physical Society

**Effects of ROS and RNS in non-equilibrium plasma enhanced oxidizing and nitriding** VITALY DATSYUK, Taras Shevchenko National University of Kyiv, IGOR IZMAILOV, VADYM NAUMOV, Institute of Semiconductor Physics, National Academy of Sciences of Ukraine, VLADIMIR KHOMICH, VYACHESLAV TSIOLKO, Institute of Physics, National Academy of Sciences of Ukraine — Plasma enhanced oxidizing and nitriding processes are of great interest for physics and applications [1]. However, despite all advances in plasma technology, mechanisms of non-equilibrium plasma chemistry are not quite clear, particularly concerning reactive oxygen and nitrogen species (ROS/RNS) in metastable states. We tried to study this matter more detail. Experiments were done in a low temperature magnetron with a non-self-sustained glow discharge in oxygen/nitrogen/argon mixtures, employing electrical and optical diagnostics. Measurements showed that plasma processing is accompanied by the formation of electronically excited particles ROS/RNS. Computer modeling by using 0D-kinetic and 1D-fluid models including ionization, excitation, dissociation-recombination, vibrational relaxation, collisional quenching and radiation revealed the most probable mechanisms of plasma-chemical transformations. Effects of metastables of singlet oxygen $O_2^*$(a,b) and nitrogen $N_2^*$(A) as well as small but important radicals $O^*(^1D)$, $N^*(^2D)$ were also examined. Our study confirms the role of ROS/RNS in plasma kinetics and indicates the way toward more efficient oxygen and nitrogen plasma processing. [1] M.A. Lieberman, A.J. Lichtenberg, Principles of Plasma Discharges and Materials Processing, John Wiley & Sons, 2005.

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Date submitted: 10 Jun 2016 Electronic form version 1.4