

Abstract Submitted  
for the DPP20 Meeting of  
The American Physical Society

**Effect of metastable excited species in non-equilibrium gas-discharge plasma of UV excimer lasers and excilamps.** 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 — Extreme UV plasma sources including UV excimer lasers and excilamps are of great interest for modern science and technology, for instance, in nanolithography [1,2]. But despite the advances in excimer plasma physics, non-equilibrium kinetics of excimer plasma is still not entirely clear, in particular, regarding metastable excited species (MES). We tried to study this issue more detail. Experiments were carried out in various rare gas mixtures in different gas-discharge conditions using electrical and optical diagnostics. Measurements showed that excimer plasma processes are accompanied by the formation of long-lived MES. Computational simulation with 0D-kinetic and 1D-fluid models, considering excitation, ionization, dissociation-recombination, relaxation, collisional quenching, and UV radiation, revealed the most probable mechanisms of reactions in excimer plasma. The effects of metastables involving electronically excited molecules and atoms were examined. The study confirmed the role of MES in excimer plasma kinetics and indicated the way to more efficient UV plasma processing. [1] D. Basting, G. Marowsky, Excimer Laser Technology, Springer, 2005. [2] E. Sosnin, V. Tarasenko, M. Lomaev, *UV and VUV excilamps*, Lambert Academic Publishing, 2012.

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Date submitted: 03 Oct 2020

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