Abstract Submitted
for the GEC20 Meeting of
The American Physical Society

1D model of the DBD discharge in Ar-S2 mixtures SVETLANA AVTAEVA[1], Institute of Laser Physics SB RAS — Spectrum of a discharge in mixtures of argon with sulfur vapor in the visible part of spectrum is similar to the solar spectrum due to strong emission of S2 molecules. This paper presents the one-dimensional fluid model of the dielectric barrier discharge (DBD) in Ar-S2 mixtures. At first kinetics of excited sulfur molecules in a discharge under various Ar-S2 mixture compositions was studied using a global model by calculating time profiles of the plasma species densities under voltage pulses at various Ar-S2 mixture compositions . The DBD was simulated in 3 mm gas gap between dielectric layers covered metallic electrodes. The spatio-temporal characteristics of the DBD in Ar with additive of 0.1 -1 % S2 were simulated at pressure 300 Torr at applying to the electrodes sinusoidal voltage with frequency 20 kHz and amplitude 8 kV. The simulations shown that the discharge radiation includes the S2* and Ar2* bands as well as Ar* lines, radiation of S* lines is small. The radiation efficiency of sulfur dimer bands strong depends on S2 content in the mixture. It is found that the Ar-S2 plasma is very electronegative even at S2 fraction of 0.1% in Ar-S2 mixture, that makes the great impact on the discharge properties.

[1]Lavrentyeva Avenue 15B, Novosibirsk, 630090, Russia

Svetlana Avtaeva
Institute of Laser Physics SB RAS

Date submitted: 23 Jun 2020 Electronic form version 1.4