

Abstract Submitted
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Dielectric Barrier Discharge and a Microwave Cavity Discharge in Synchronous Operation MILKA NIKOLIC, SVETOZAR POPOVIC, Old Dominion University, ROBERT LEIWEKE, UES, Inc., BISWA GANGULY, Wright-Patterson AFRL, LEPOSAVA VUŠKOVIC, Old Dominion University — We describe a system consisting of two discharges, a dielectric barrier discharge and a microwave cavity discharge, acting simultaneously as a tandem in pulsed repetitive regime, with controllable space, time, and power distribution. The two discharges interact by providing lower breakdown conditions, modified gas flow composition, and a more efficient production of chemically active species. We demonstrate modification of the downstream microwave discharge, its operation up to near-atmospheric conditions at limited power density, with extended post-discharge region. The operation of two discharges is exemplified by the optimized generation and sustaining of metastable oxygen in He/O₂, Ar/O₂ mixture. Metastable oxygen is monitored during discharge and in the post-discharge by time-resolved detection of selected emission bands. Intensity of the emission bands in the post-discharge allowed for determining the rotational temperature, and also for estimating the concentration of the O₂ excited species.

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