

Abstract Submitted
for the GEC06 Meeting of
The American Physical Society

Gain Measurements in a Non-Self-Sustained Electric Discharge Pumped Oxygen-Iodine Laser Cavity IGOR ADAMOVICH, ADAM HICKS, YURII UTKIN, WALTER LEMPERS, J. WILLIAM RICH, Ohio State University — The paper presents results of singlet delta oxygen (SDO) yield measurements in a high-pressure, non-self-sustained crossed discharge and small signal gain measurement on the iodine atom transition in the M=3 supersonic cavity downstream of the discharge. The results demonstrate operation of a stable and diffuse crossed discharge in O₂ – He mixtures at pressures of up to P₀=120 torr and discharge powers of up to 2.2 kW. The reduced electric field in the sustainer discharge in O₂-He flows ranges from 6 to 12 Td. Singlet delta oxygen yield in the discharge, up to 5.0-5.7% at the discharge temperatures of 400-420 K, was inferred from the integrated intensity of the (0,0) band of the SDO infrared emission spectra calibrated using a blackbody source. These results suggest that the measured singlet delta oxygen yield would exceed the threshold yield at the flow temperature achieved in the supersonic cavity, T=120 K, by about a factor of three. Gain measurements clearly confirmed this prediction. Preliminary measurements demonstrate gains of up to 0.03%/cm measured in the supersonic cavity at these conditions.

Igor Adamovich
OSU

Date submitted: 18 Jul 2006

Electronic form version 1.4