LASER PHOTOLYSIS OF THE $N_2O/I_2/CO_2/Ar$ MIXTURES AT 193 NM

M. H. KABIR, V. AZYAZOV, I. O. ANTONOV, and M. C. HEAVEN, *Department of Chemistry, Emory University, Atlanta, GA 30322*.

Oxygen-iodine lasers that utilize electrical discharges to produce $O_2(a^1\Delta_g)$ are currently being developed. The discharge generators differ from those used in conventional chemical oxygen iodine lasers in that they produce significant amounts of atomic oxygen. The post-discharge chemistry includes channels that are both beneficial and detrimental to the laser. The beneficial reactions result in the dissociation of I_2 while the detrimental processes cause direct and indirect removal of $I(^2P_{1/2})$ (the upper level of the laser). We have examined kinetic processes relevant to the laser through studies of photo-initiated reactions in N_2O/I_2 mixtures. The reactions have been monitored using absorption spectroscopy, LIF, and time-resolved emission spectroscopy. A kinetic model has been developed from these data, and the rate constants for the deactivation of $I(^2P_{1/2})$ by $O(^3P)$ ($k = 1.2 \times 10^{-11}$ cm^3 s^{-1}) has been determined for the first time.