

Abstract Submitted
for the GEC10 Meeting of
The American Physical Society

Spectroscopic studies of long-lived excited species in flowing nitrogen afterglows at intermediate pressures ROBERT CARMAN, SCOTT ALLAN, PETER HA, Macquarie University, CONOR MARTIN, SATYA BARIK, BluGlass Ltd, CORMAC CORR, ROD BOSWELL, Australian National University — Plasma kinetics issues associated with the production and quenching of long-lived $N_2^*(A)$ and $N^*(^2D, ^2P)$ metastable species present in the flowing afterglows of pure nitrogen plasmas are currently of topical interest. These plasmas are used in emerging applications such as remote plasma chemical vapour deposition (RPCVD) to grow group III nitride thin films. We have generated flowing N_2 afterglows at intermediate pressures (1-50 torr) experimentally using both microwave (2.45GHz) and RF (13.56MHz) excitation methods. The afterglows have been studied using optical emission spectroscopy (ACTON VM502 monochromator/photomultiplier operating in photon counting mode) with particular emphasis on the ultraviolet range 220-340nm to detect the very weak Vegard-Kaplan band system corresponding to the slow decay of the $N_2^*(A)$ metastables. Preliminary results reveal the presence of $NO(\gamma)$ band system (210-280nm) in the late afterglow, highlighting the sensitivity of the $N_2^*(A)$ population to strong quenching by background O_2/H_2O trace impurities.

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Date submitted: 11 Jun 2010

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