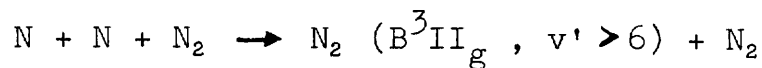


Spectroscopic Analysis of the Nitrogen Recombination in
a Flowing Afterglow Arc Discharge

A. Ricard

The spectroscopic analysis of the flowing afterglow at the issue of an hollow cathode arc discharge in nitrogen (current $I = 10$ A, voltage $V = 25$ volts, flow rate $Q = 4$ to 7×10^{-2} gr sec^{-1}) has given the following results:

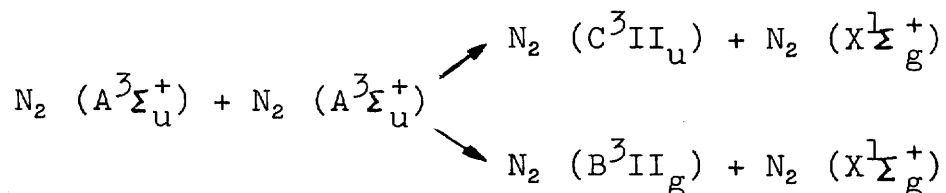
1) At large distance downstream the plasma source ($l > 100$ cm, gas speed $v \sim 10^4$ cm sec^{-1}) there is a diffuse emission of the 1st positive system from the high vibrational levels $v' > 6$ of the N_2 (B^3II_g) state. This afterglow is due to the nitrogen atoms recombination:



2) At short distance ($l < 40$ cm) we have observed the emission of the 1st negative, 1st and 2^{sd} positive systems.

The first afterglow can be attributed to the two following processes:

- a - an excitation of the gas by non thermalized electrons, diffusing from the discharge
- b - a pooling effect between two metastable molecules N_2 [$(\text{A}^3\Sigma_u^+)$]:



Dr. A. Ricard
Laboratoire de P.M.I.
Université Paris XI
Orsay / France