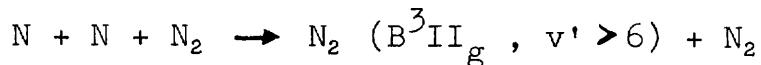


Spectroscopic Analysis of the Nitrogen Recombination in  
a Flowing Afterglow Arc Discharge

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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  $7 \times 10^{-2}$  gr sec $^{-1}$ ) has given the following results:

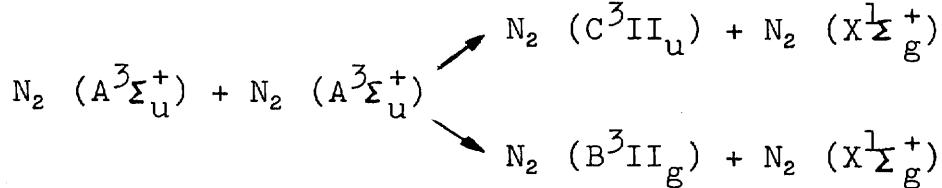
1) At large distance downstream the plasma source ( $l > 100$  cm, gas speed  $v \sim 10^4$  cm sec $^{-1}$ ) there is a diffuse emission of the 1<sup>st</sup> positive system from the high vibrational levels  $v' > 6$  of the  $N_2$  ( $B^3II_g$ ) state. This afterglow is due to the nitrogen atoms recombination:



2) At short distance ( $l < 40$  cm) we have observed the emission of the 1<sup>st</sup> negative, 1<sup>st</sup> and 2<sup>nd</sup> 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  $N_2$  [ $(A^3\Sigma_u^+)$  :



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