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Detection of CN (B $^2\Sigma^+$) in cold atmospheric plasma jet in argon
JAYR AMORIM, MARCO RIDENTI, Departamento de Fisica, Instituto Tecnologico de Aeronautica — CN($B^2\Sigma^+ \rightarrow X^2\Sigma^+$) violet system was investigated using optical emission spectroscopy in a non-equilibrium microwave atmospheric-pressure plasma jet in argon expanding in air. From the analysis of the emission spectra of the discharge in the range of 380 nm and 400 nm, the violet system of CN was found to be overlapped with the N_2^+ ($B^2\Sigma_u^+$, v=1$\rightarrow X^2\Sigma_g^+$, v=1) and $N_2(C^3\Pi_u \rightarrow B^3\Pi_g)$ bands, sequence Δv=-3. Data fitting procedure was numerically implemented by means of a homemade routine to disentangle the overlapped spectra of the three different band systems. Through this deconvolution technique it was possible to determine the CN ($B^2\Sigma^+ \rightarrow X^2\Sigma^+$) band head intensity as function of discharge powers between 30 W and 150 W and fluxes between 2.5 slm and 10.0 slm. Maximum intensity of violet band head was found for power of 150 W, flux of 2.5 slm, and for 10.0 slm power of 100W, showing that both power and flow rate increase the cyan violet system emission. Small admixture of nitrogen to the flux put in evidence the importance of excited nitrogen states in the formation of the CN (B $^2\Sigma^+$) state. The rotational temperatures and vibrational temperature were determined for the upper state level CN (B $^2\Sigma^+$).

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