CO/He GLOW DISCHARGE TEMPERATURE MEASUREMENTS USING CO 4th POSITIVE BAND LIF

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Single-photon Laser Induced Fluorescence has been used to measure the trans-rotational temperature of mildly vibrationally excited carbon monoxide ($v''\leq 9$) within the positive column of a CO/He normal d.c. glow discharge.[a] A tunable, narrowband ArF excimer laser at 193nm was used to pump the strongly allowed CO $X^1\Sigma^+(v''=7)\rightarrow A^1\Pi(v'=1)$ transition with subsequent collection of the 200.8nm (1,8) 4^{th} Positive emission.[b] The resulting rotational spectral peaks were assigned and a subset was used to estimate the rotational temperature to be 432 ± 72K (3σ). Fourier Transform – InfraRed spectroscopic measurements of this plasma were in good agreement at 395 ± 10K. These results indicate that within a normal glow discharge environment, CO 4^{th} Positive LIF is well suited as a temperature diagnostic.

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[a] S. DeBenedictis, *Chem. Phys.*, **71**, p.247, 1982.
[b] G.L. Wolk and J.W. Rich, *Chem. Phys. Lett.* **87**, p. 117, 1982.