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**Electrical and Optical Structural Analysis of Pure Nitrogen RF-CCP** MMGL ERZBEK GNGR, Dr. — In this work, 13.56 MHz pure (99.995 %) nitrogen discharges were generated in a stainless steel cylindrical reactor (R∼500 mm, H∼400 mm). Two identical aluminum electrodes with R∼200 mm were placed in the reactor at a 4 cm gap distance. A High-Resolution HR2000 fiber optic spectrometer (200-1100 nm) was connected to the system to do parametrical analyses. The RF power was in the range of 50-200 W and the pressure was in the range of 0.2-0.7 Torr. I detected many nitrogen atomic lines of N, $N^+$ and $N^{++}$ in the UV-Vis-NIR spectral regions. Strong $N^{++}$ atomic lines (336.3, 379.45 nm) are mainly dominated the spectrum. Two atomic lines (677.28, 773.26 nm) of the N are ˜four times weaker than that of $N^{++}$. The atomic lines of the $N^+$ are ˜10 times weaker than that of $N^{++}$. Also many molecular nitrogen bands, which are the first positive $N_2$ (B-A) system (530-970 nm), the second positive $N_2$ (C-B) system (290-531 nm) and the first negative $N_2^+$ (B-X) system (410-530 nm) are observed. The excitation temperature ($T_{exc}$) and the electron density ($n_e$) of the $N^+$ and $N^{++}$ atomic ions were calculated for each discharge condition.

mmgl Erzbek Gngr
Dr.

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