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Determination Of The Temperature Distribution In The Cathode Sheath Region Of Hydrogen Glow Discharge Using R-Branch Of Fulcher- α Band

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Optical emission spectroscopy technique was used to measure rotational and gas temperature distribution in the cathode-sheath region of an abnormal glow discharge operated in hydrogen. The rotational temperature of excited electronic states of H₂ was determined from the relative line intensities of the R-branch of the Fulcher- α diagonal band $d^3\Pi_u^+, \nu' = 0 \rightarrow a^3\Sigma_g^+, \nu'' = 0$ and compared with published results for the Q-branch of the Fulcher- α diagonal band $d^3\Pi_u^-, \nu' = 0 \rightarrow a^3\Sigma_g^+, \nu'' = 0$. The population of excited energy levels, determined from the relative line intensities, was used to derive the rotational temperature of the ground state of hydrogen molecule. The boundary between the cathode sheath and negative glow region is determined using Stark polarization spectroscopy of the hydrogen Balmer alpha line.

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