

Abstract Submitted
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Determination of Collisional Quenching Rate Coefficient of $\text{N}_2(\text{A}^3\Sigma_u^+)$ by H_2O SUSUMU SUZUKI, HARUO ITOH, Chiba Institute of Technology — The effective lifetimes of metastable excited molecule $\text{N}_2(\text{A}^3\Sigma_u^+)$ in $\text{N}_2/10.2\text{ppm H}_2\text{O}$ and $\text{N}_2/103\text{ppm H}_2\text{O}$ mixtures were measured by waveform analysis⁽¹⁾ of the transient ionization current after interruption of the initial electron from the cathode in the Townsend discharge region. The collisional quenching rate coefficient of $\text{N}_2(\text{A}^3\Sigma_u^+)$ by H_2O was determined together with the diffusion coefficient of $\text{N}_2(\text{A}^3\Sigma_u^+)$ in nitrogen and the reflection coefficient of $\text{N}_2(\text{A}^3\Sigma_u^+)$ at the cathode surface with the procedure based on the diffusion equation analysis⁽²⁾. The obtained collisional quenching rate coefficient of $\text{N}_2(\text{A}^3\Sigma_u^+)$ by H_2O is $5.7 \times 10^{-13} \text{ cm}^3/\text{s}$. This value is ten times as large of the value reported by Callear and Wood⁽³⁾. (1) S. Suzuki, H. Itoh, H. Sekizawa and N. Ikuta, J. Phys. Soc. Jpn., 62, No.8, 2692-2697 (1992) (2) S.Suzuki and H.Itoh, J. Phys D: Appl. Phys., 49,185202(14pp) (2016) (3) A. B. Callear and P. M. Wood, Trans. Faraday Soc., 67, 598-600 (1971)

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