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Determination of collisional quenching rate coefficient of $N_2(A^3\Sigma_u^+)$[1] YUUSUKE KOIZUMI, SUSUMU SUZUKI, HARUO ITOH, Chiba Institute of Technology — We have previously determined the collisional quenching rate coefficient of $N_2(A^3\Sigma_u^+)$ by an air pollutant gas [1-4]. In this paper we report the collisional quenching rate coefficient k' of $N_2(A^3\Sigma_u^+)$ by p-xylene (C_8H_{10}), which was determined to be $(6.5\pm0.9)\times10^{-9}$ cm^3/s. In addition, through repeated experiments it was found that by-products of p-xylene were deposited on the cathode, similarly to the cases of m-xylene and o-xylene previously reported [4], and then the current-voltage curves consistently shifed to a higher-E/p_0 region. To clarify the reason for this behavior, we confirmed by Auger electron spectroscopy (AES) and Fourier transform infrared spectroscopy (FTIR) that these changes in the current-voltage curves were caused by the deposition of a thin film of by-product of decomposed xylene on the cathode surface. According to the results of AES, C atoms were detected in a sample exposed to an electrical discharge, and we confirmed that the deposit of C was thickest in the case of electrical discharge in p-xylene. According to the results of FTIR, it was found that CH_2 and CH were obtained from the deposition of p-xylene.

[1] S. Suzuki, H. Itoh, H. Sekizawa and N. Ikuta, J. Phys. Soc. Jpn., 62, No.8, 2692-2697 (1993)
[2] S. Suzuki, H. Itoh, H. Sekizawa and N. Ikuta, Jpn. J. Appl. Phys., 36, 4744-4746 (1997)
[3] S. Suzuki, T. Suzuki and H. Itoh, Cont. of HAKONE X Saga, Japan, 132-135 (2006)
[4] S. Suzuki, H. Itoh, Proc. of 30th ICPIG (Belfast, UK), A1-12 (2011)

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Susumu Suzuki
Chiba Institute of Technology

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