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Temporally resolved plasma spectroscopy for analyzing natural gas components KAZUNOBU KOBAYASHI, Osaka Gas Co., Ltd., NAOMASA TSUMAKI, TSUYOHITO ITO, Osaka University — Temporally resolved plasma spectroscopy has been carried out in two different hydrocarbon gas mixtures (CH_4/Ar and C_2H_6/Ar) to explore the possibility of a new gas sensor using plasma emission spectral analysis. In this experiment, a nanosecond-pulsed plasma discharge was applied to observe optical emissions representing the initial molecular structure. It is found that a CH emission intensity in CH_4/Ar is higher than that in C_2H_6/Ar. On the other hand, C_2 intensities are almost the same degree between CH_4/Ar and C_2H_6/Ar. This finding indicates that the emission intensity ratio of CH to C_2 might be an effective index for a gas analysis. In addition, a time for the highest emission intensities of CH and C_2 is several nanoseconds later than that of Ar. This result suggests that spectra from the initial molecular structure may be observed at the early stage of the discharge before molecules are fully dissociated, and this is currently in progress.

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