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Characterization of a non-thermal plasma system at atmospheric pressure¹ S. YAO, C. FUSHIMI, K. MADOKORO, Y. FUJIOKA, Chemical Research Group, Research Institute of Innovative Technology for the Earth, Kyoto 619-0292, Japan — Recently, the authors have developed a non-thermal plasma system for the removal of harmful particulate matter from diesel engines. In this paper, the characterization of such a non-thermal plasma system (typically including a dielectric barrier discharge (DBD) reactor and a pulse power supply) is carried out electrically and optically using a discharge waveform measurement system of a voltage probe, two current transformers, and an oscilloscope, a high dynamic range streak camera combined with a spectroscope, and a high speed camera. The pulse voltage is applied to the DBD reactor at a fixed value and a frequency of 100 Hz. The rise time, positive width, and peak value of the pulse voltage are, respectively, 3.5 μ s, 6 μ s, and 13.2 kV. The discharge time duration is 14 μ s. The optical emission from the discharge gap lasts for 14 μ s. The emission lines are found within 300 - 410 nm and 620- 770 nm. The discharges are generally of an individual micro-discharge property as reported elsewhere.

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