

Abstract Submitted
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Mechanisms of Methylene Blue Degradation in Three-dimensionally Integrated Micro-solution Plasma AYANO NOMURA, Osaka City University, YUI HAYASHI, Nagoya University, KENJI TANAKA, TATSURU SHIRAFUJI, Osaka City University, MOTONOBU GOTO, Nagoya University — Plasma in aqueous solution has attracted much attention because they are expected to have possibilities to solve water-related environmental issues. In such application-oriented researches, degradation of methylene blue (MB) or other organic dyes has been widely used for investigating the effects of the plasma treatment on the water with organic contaminants. However, there are few reports on the detailed analysis of the products after the plasma treatment of MB aqueous solution for understanding mechanisms of the degradation processes. We have hence analyzed our degradation products using matrix-assisted laser desorption ionization time-of-flight (MALDI-TOF) mass spectrometry. We have performed the MB degradation in three-dimensionally integrated micro-solution plasma, which has shown 16-fold higher performance in MB degradation than conventional solution plasma. The results of MALDI-TOF mass spectrometry have indicated the formation of sulfoxides in the first stage of the degradation. Then, the methyl groups on the sulfoxides are partially oxidized. The sulfoxides are separated to form two benzene derivatives after that. Finally, weak functional groups are removed from the benzene derivatives.

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