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Advanced oxidation processes for wastewater treatment using a plasma/ozone combination system NOZOMI TAKEUCHI, YU KAMIYA, RYO SAEKI, KOSUKE TACHIBANA, KOICHI YASUOKA, Tokyo Institute of Technology — Advanced oxidation process (AOP) using OH radicals is a promising method for the decomposition of persistent organic compounds in wastewater. Although many types of plasma reactors have been developed for the AOP, they are unsuitable for the complete decomposition of highly concentrated organic compounds. The reason for the incomplete decomposition is that OH radicals, particularly at a high density, recombine among themselves to form hydrogen peroxide. We have developed a combination plasma reactor in which ozone gas is fed, so that the generated hydrogen peroxide is re-converted to OH radicals. Pulsed plasmas generated within oxygen bubbles supply not only OH radicals but also hydrogen peroxide into wastewater. The total organic carbon (TOC) of the wastewater was more than 1 gTOC/L. The TOC values decreased linearly with time, and the persistent compounds which could not be decomposed by ozone were completely mineralized within 8 h of operation.

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