

Degradation of chemicals in industrial wastewater by non-thermal plasma submerged in water

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Wastewater has been increased and emitted into river with developing industry, resulting in water shortage in the worldwide. The original protection of wastewater is no development, however, it is impossible. Eventually, we must reuse the wastewater through various processes including well-known approaches. Among the alternatives to conventional water treatment processes, plasma technique shows a unique characteristics in purifying and sterilizing pollutants, especially micro-pollutant and recalcitrant pharmaceutical residues. In the context, we examined the simulated test using methylene blue and rhodamine B as chemical agents by making use of our specially-designed dielectric barrier discharge (DBD) plasma system, which are tested to show the performance of plasma degradation. The outer dielectric in the plasma electrode composition has many small holes (one millimeter) with intervals of 5 mm. In designing the plasma electrodes, we aimed to increasing the interfacial area between water and plasma [1, 2]. In treating two chemicals, we analyzed total organic carbon (TOC), chemical oxygen demand (COD), decoloration, etc. at different applied powers and along with treatment time. Also, we carried out the treatment experiments of industrial wastewater from Dongdocheon city, South Korea. The wastewaters were from a dyeing process and a printing process, being with very high chromaticity of approximately 1000, COD of about 300 ppm, etc. The test results showed the good performance of our non-thermal plasma system with rapid decomposition of chemicals in the waste water.

References

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