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Optimization of Persistent Organic Pollutants Treatment in Wastewater Using by Nanosecond Pulsed Non-Thermal Plasma

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The global water environment continues to worsen mainly due to organic pollution caused by agricultural and domestic and industrial wastewater. Wastewater includes many kinds of pollutants. Among them, persistent organic pollutants (POPs) present serious problems due to their high environmental persistence and hormone-like activation. Further, they are resistant to environmental degradation and thus cannot be decomposed by conventional water treatments. The search for a highly efficient POPs treatment method has brought attention to direct water treatment by discharge plasma. Especially, nano-second (ns) pulsed discharges enable higher energy efficiencies of plasma processing and have already demonstrated their advantages at such gas phase treatment processes as NO_x treatment and ozone generation. However, few reports exist on water treatment using ns pulsed discharge plasmas.

This study reports on efforts to decompose industrial wastewater using ns pulsed discharge method by spraying wastewater into the oxygen gas phase plasma region; it also evaluates the pH, oxygen flow rate, discharge voltage, pulse repetition rate and discharge reactor constitution on wastewater decomposition. Concentration of Total Organic Carbon (TOC) in the solution and HPLC analysis is evaluated under several treatments.

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