

Abstract Submitted
for the GEC16 Meeting of
The American Physical Society

Underwater plasma discharge and its water treatment applications. SUKHWAL MA, JIN YOUNG HUH, KANGIL KIM, YONG CHEOL HONG, National Fusion Research Institute, NATIONAL FUSION RESEARCH INSTITUTE TEAM, CHONBUK NATIONAL UNIVERSITY TEAM, KWANGWOON UNIVERSITY TEAM, NPAC TEAM — In recent, the quality of water has been exacerbated by the influx of wastewater and water pollutants. There have been frequent occurrences of water blooms due to the eutrophication of river. Therefore, the needs for water treatment are increased through effective and environment-friendly method. In this work, we propose the plasma system to overcome the problems mentioned above using underwater discharge plasma. The underwater discharges are generated by capillary electrode, and have the advantages of low cost, high efficiency and eco-friendly processing. The proposed technologies can be suitable for eliminating cyanobacteria, decreasing the concentration of oil dissolved in water, and purifying wastewater. Cyanobacteria is killed directly by the underwater discharge and water-dissolved oil and heavy-metal wastewater are purified by coagulation effect, which may result from the chemical reactions of underwater plasma. Consequently, these technologies using underwater discharge can be alternative methods to replace the existing technologies.

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Date submitted: 10 Jun 2016

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