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3P26 - Study of Conductivity on Hydrogen Peroxide Concentration by High Repetitive Underwater Discharge

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Underwater discharges generate shock waves, active species such as OH radicals, high electric fields and so on. Underwater discharges have been studied for algae treatment and ballast water treatment. The conductivity of water treated by underwater discharge is different. Therefore, it is necessary that investigation about the influence of underwater discharge on the change of conductivity. OH radicals have a very strong oxidizing power, however their lifetime is very short. Hydrogen peroxide is a by-product of OH radicals, it is possible to investigate the amount of OH radicals generated by measuring the amount of hydrogen peroxide. Our research is study of conductivity on hydrogen peroxide concentration by high repetitive underwater discharges.
Experimental environments are as follows: pulse discharge by MPC (magnetic pulsed compression) method with maximum output 1 J/pulse and repetition frequency of 250 pps (pulses per second), liquid conductivity 110 to 45000 μS/cm, number of shots 2000 to 100000, pack test for hydrogen peroxide (WAK-H2O2, Kyoritsu Chemical-Check Lab. Corp.), visible spectrophotometer, a high voltage prove, a current monitor, a high speed camera for plasma movies.
Result, the residual amount of hydrogen peroxide decreased as the conductivity increased, and the increasing rate of the residual amount of hydrogen peroxide slowed as the number of shots increased. After 40000 shots, the increasing rate of the residual amount of hydrogen peroxide was almost constant.

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