

Abstract Submitted
for the GEC11 Meeting of
The American Physical Society

Some chemical properties of plasmas created in liquid solutions LUCIE NEMCOVA, FRANTISEK KRCMA, Brno University of Technology, COLIN KELSEY, BILL GRAHAM, Centre for Plasma Physics, Queens University of Belfast — Underwater electrical discharges have become a major focus of study recently primarily due to their many practical applications. Such applications include degradation of hazardous organic compounds, killing of microorganisms, chemical synthesis and electrosurgery. A small multi-electrode system is used. The plasma is created using a small (~ 3.5 mm diameter) four electrode circular device with a coaxial earth and with each electrode driven with 100 kHz RF bipolar square wave voltage. Four different inorganic solutions were used: 0.15 mol KCl, NaCl, BaCl₂ and Na₂CO₃. These solutions were at room temperature at the start of experiment and were gradually brought to boiling. The chemical and physical plasma properties were studied. Optical emission spectroscopy has been used to demonstrate OH radical production which is important since this species is known to react readily with many pollutants. In all solutions except Na₂CO₃ hydrogen peroxide generation was also observed also. Hydrogen peroxide is one of the most important species which the plasma produces because it helps with water treatment. The pH values were examined also but remained stable during all measurements.

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Date submitted: 13 Jul 2011

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