

Abstract Submitted  
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**Plasmas in conducting solutions for treatment of contaminated water** COLIN KELSEY, BILL GRAHAM, Centre for Plasma Physics, Queens University of Belfast, AHMAD MASHAL, DAVID ROONEY, ROBERT GÁMEZ SANS, School of Chemistry and Chemical Engineering, Queens University of Belfast — A plasma produced in a conducting liquid is compared with more conventional advanced oxidation processes currently used in wastewater treatment such as the Fenton Process. The plasma was produced using a four electrode setup with driving circuitry producing 100 kHz bipolar square waves of approximately 300V. We compare the effectiveness of the two processes by comparing the reduction in chemical oxygen demand achieved by each. Results indicate that for treatment times of 40 seconds our bench system can achieve a 50% COD reduction across a wide range of input COD concentrations, which is better than the reduction achieved by the single dose Fenton treatment process. Using electrical measurements the efficiency of the plasma process is determined to enable initial estimates of the feasibility of the process for industrial use. Chemical measurements on the plasma system are used to gain insight into the mechanisms underlying the process. These measurements include hydrogen peroxide production rate, which was determined to be 0.5 mg per minute, pH change, which increases with time, but tended to values of 1-3 pH units for characteristic treatment times, and temperature.

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