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Pulsed Electrical Discharge in a Gas Bubble in Water ERICA SCHAEFER, Hartwick College, Oneonta, NY, SOPHIA GERSHMAN, Rutgers University, Piscataway, NJ, OKSANA MOZGINA, ABE BELKIND, KURT BECKER, Stevens Institute of Technology, Hoboken, NJ — This experiment is an investigation of the electrical and optical characteristics of a pulsed electrical discharge ignited in a gas bubble in water in a needle-to-plane electrode geometry. Argon or oxygen gas is fed through a platinum hypodermic needle that serves as the high voltage electrode. The gas filled bubble forms at the high voltage electrode with the tip of the needle inside the bubble. The discharge in the gas bubble in water is produced by applying 5 – 15 kV, microsecond long rectangular pulses between the electrodes submerged in water. The voltage across the electrodes and the current are measured as functions of time. Electrical measurements suggest a discharge ignited in the bubble (composed of the bubbled gas and water vapor) without breakdown of the entire water filled electrode gap. Time-resolved optical emission measurements are taken in the areas of the spectrum corresponding to the main reactive species produced in the discharge, e.g. OH 309 nm, Ar 750 nm, and O 777 nm emissions using optical filters. The discharge properties are investigated as a function of the applied voltage, the distance between the electrodes, the gas in the bubble (Ar or O_2). Work supported by the US Army, Picatinny Arsenal, NJ and the US DOE (Contract number DE-AC02-76CH03073).

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