

Abstract Submitted
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Characteristics of the Plasma Environment and Discharge Process in a High-Pressure Pulsed Arc Discharge. RICKY TANG, MATTHEW HOPKINS, EDWARD BARNAT, Sandia National Labs — The characteristics and properties of a plasma generated in a pulsed arc discharge are investigated. Arc discharge plasmas are prevalent in the production and treatment of materials. Photodetectors and optical emission spectroscopy (OES) are used to probe the plasmas and characterize their spectral responses. OES allows for species identification and provides information about the state of the plasma, such as the electron temperature. Discharges generated with inert gas such as argon, as well as with nitrogen and air, are studied and compared. In the case of reactive gases, OES also provides information on the possible reactions that took place. Microwave interferometry is used to measure the electron density to provide spatial information on the discharges. In addition, the measurement is synchronized with the discharge pulse to obtain temporal information, for instance, during the pulse initialization phase to investigate the arc discharge process prior to plasma generation, where optical information is absent. Together, this allows for the characterization of the pre-, during, and post-discharge processes.

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