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Spectroscopic Analyses of Electrode Plasmas Generated in High Intensity Electron Beam Diodes¹ MARK D. JOHNSTON, BRYAN V. OLIVER, Sandia National Laboratories, DARRYL W. DROEMER, National Security Technologies, YITZHAK MARON, V. BERNSTAM, Y. ZARNITSKY, E. KLODZH, Weizmann Institute of Science — The self magnetic pinch (SMP) electron beam diode is being investigated as an intense flash x-ray radiographic source. The diode produces a focused e-beam (<3mm diameter) at 7 MeV and 150kA with a 45ns FWHM pulsewidth. Since the vacuum gap is small (~ 1 cm), plasmas formed on the electrode surfaces affect the diode impedance, x-ray spectrum, pulsewidth, and e-beam dynamics. Temporal and spatially resolved optical spectra are collected and analyzed using self-consistent, time-dependent, collisional radiative (CR) models which provide information about plasma species, densities, and temperatures. This data is used to verify plasma conditions and help benchmark hybrid PIC codes which simulate these plasma environments. Recent experimental results obtained for the SMP diode fielded on the RITS-6 accelerator are presented.

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