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In-Situ Anode Heating and Its Effects on Atomic Constituents in the A-K Gap in Self-Magnetic Pinch (SMP) Experiments* SEAN SIMPSON, TIMOTHY RENK, MARK JOHNSTON, MIKE MAZARAKIS, Sandia National Laboratories, SONAL PATEL, University of Michigan — The RITS-6 inductive voltage adder (IVA) accelerator (3.5-8.5 MeV) at Sandia National Laboratories produces high-power (TW) focused electron beams (<3mm diameter) for flash x-ray radiography applications. The Self-Magnetic Pinch (SMP) diode utilizes a hollowed metal cathode to produce a pinched focus onto a high-Z metal anode converter. There is not a clear understanding as to the effects various contaminants such as C, CO, H, H₂O, H_mC_n, O₂, and N₂, on the anode surface or in the bulk may have on impedance dynamics, beam stability, beam spot size, and reproducibility. Heating pure Ta anodes with and without a thin Al coating have been investigated using temperatures ranging from 400 °C to 1000 °C. Initial experiments indicate a significant reduction in H and C as seen in high-speed spectral analysis of plasmas at the converter and a reduction in the back-streaming proton current. Experiments are ongoing, and latest results will be reported.

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