

A HIGH EFFICIENCY POSITIVE-SURFACE-IONIZATION SOURCE

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During this reporting period, a high efficiency positive-surface-ionization source was conceived and designed for generation of RIBs from members of the Group IA elements (Li, Na, K, Rb, Cs, and Fr) as well as other highly electropositive species. The source, illustrated schematically in Fig. 1, features a first-of-its-kind high-permeability (porosity, $\rho/\rho_0 \approx 0.08\%$) W surface ionizer that operates at $\sim 1200^\circ\text{C}$, and improved optics described in another section of this report. The open-porosity-ionizer simultaneously ensures efficient surface-ionization while permitting low impedance effusion of these elements through the matrix. The final design was taken from the positive/negative-surface-ionization source, described in another contribution to this report, that has been extensively tested with Cs-vapor and found to ionize Cs with efficiencies ranging between 60% and 100%. The source shown in Fig. 1 will be fabricated and will be further evaluated during FY 99; following these tests, the source will be placed in inventory for future use in the HRIBF research program.

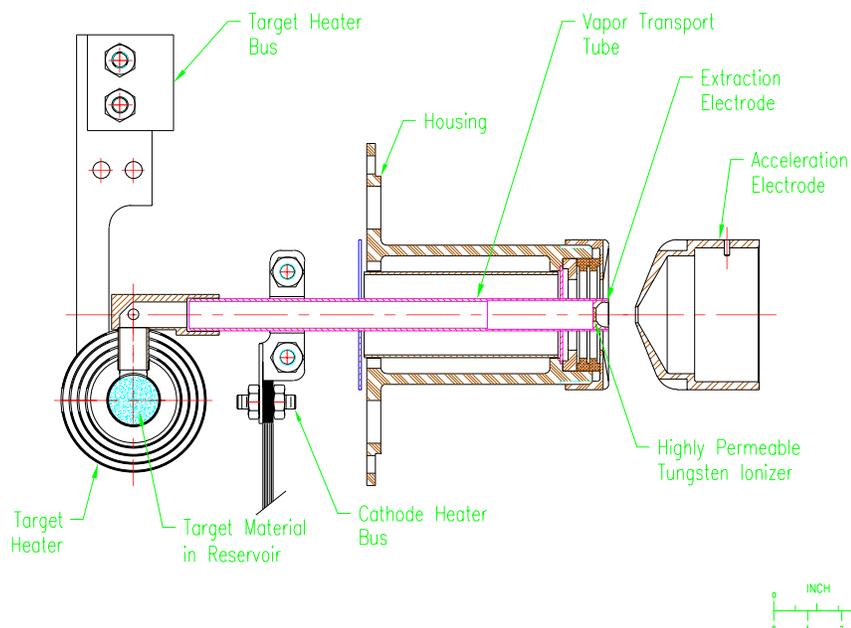


Fig. 1. Schematic drawing (side view) of the high-efficiency positive surface-ionization source designed for generating RIBs of highly electropositive elements (e.g., members of the Group IA elements (Li, Na, K, Rb, Cs and Fr)). The source features a high permeability W ionizer that operates at 1200°C .