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Thermal investigations of target materials at TRIUMF

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A dedicated test stand has been designed, constructed, and installed in the ISAC experimental hall at TRIUMF to perform thermal characterization of target materials. The setup features a vacuum chamber in which an electron beam is generated and accelerated across a high-voltage gradient to irradiate material samples. The system has been successfully commissioned, demonstrating the ability to heat samples beyond 2000 ℃. Benchmarking was performed using graphite samples with well-established thermal properties. The stand accommodates samples with thicknesses ranging from 25 µm to 5 mm.

This paper presents a combined numerical and experimental approach used to evaluate the thermal behavior of target materials. The test stand plays a critical role in characterizing materials developed in-house for the ISAC facility and the upcoming ARIEL project at TRIUMF. It enables studies on how porosity and morphology in target materials influence thermal performance, guiding the optimization of target materials for high-intensity isotope production.

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