

## Recent Progress in Off-line Test Facility Experiments for the RAON ISOL Ion Sources

Thursday, November 14, 2024 1:00 PM (1h 30m)

At the Rare Isotope Accelerator complex for ON-line experiments (RAON), the Isotope Separation ON-Line (ISOL) facility utilizes three types of ion sources to produce Rare Isotope (RI) beams for various research purposes. The RAON ISOL RI beam was commissioned by producing Na, Al, and Li-ion beams with a surface ion source. Beam tests using the Resonant Ionization Laser Ion Source were also successfully conducted. In addition, we are currently developing a new plasma ion source, the Forced Electron Beam Induced Arc Discharge (FEBIAD) ion source. [1]

An ISOL Off-line Test Facility (OLTF) was re-installed. This OLTF consists of the target/ion source and front-end system, ion beam optics and diagnostic systems, a dipole magnet, vacuum system, and control system. The OLTF provides an environment for independent testing and optimization of the ion source. We have completed testing the performance of the OLTF using a surface ion source. The data and experience gained from this testing process will be invaluable for improving and optimizing the FEBIAD ion source at the RAON ISOL facility (RISFAC).

The existing FEBIAD ion source has thermal issues due to its high operating temperatures, leading to performance degradation and stability problems. We have developed a new structure for the FEBIAD ion source to address these issues. The redesigned FEBIAD ion source incorporates effective thermal distribution and expansion mechanisms, enabling stable operation even at high temperatures. We will test whether the FEBIAD ion source operates stably at high temperatures in the OLTF and evaluate how high temperatures affect its performance, making improvements as needed.

After conducting the FEBIAD ion source test using the OLTF, the ISOL RI beam experiment will combine with the uranium carbide target starting in mid-2025. The RISFAC will then be able to supply users with various neutron-rich RI beams using three types of ion sources.

### Paper submission Plan

No

### Best Presentation

Yes

### Contribution track

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