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Improvement of the FEBIAD Ion Source at SPIRAL1

Several ISOL facilities are using the FEBIAD ion source to produce a large variety of radioactive ion beams. SPIRAL1 at GANIL has been using this source coupled with a carbon target for 8 years with issues regarding ionization efficiency, stability and operating time. Conclusions of in-depth tests and analysis of the target and ion source system conducted in 2020 are reported. They show that the beryllium oxide insulator temperature plays a critical role in the FEBIAD behavior. Thermal, mechanical and electrical modifications based on the understanding of the source led to significant performance improvements, in other words 15% Ar+ ionization efficiency for more than a week and reduced parameter drifts, suggesting a possible operation time of 2 weeks at minimum. On-line operation successfully produced $^{47}K^{+}$ for another week, and production of other metallic isotopes was tested. Tests, results and an upgraded version will be presented.

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