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Recent achievements in the production of metallic ion beams with the CAPRICE ECRIS at GSI

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The GSI CAPRICE Electron Cyclotron Resonance Ion Source (ECRIS) provides highly-charged ion beams for various experiments at GSI, enabling the delivery of continuous wave (CW) metallic ion beams with low material consumption, which is crucial for producing high charge state ion beams from rare or extremely rare isotopes such as ^{48}Ca . These metallic beams are produced utilizing the thermal evaporation technique by resistively heated ovens. Due to the research groups' demand for higher beam intensities, increased ion currents of higher charge states are now necessary from the CAPRICE ECRIS.

A test campaign was conducted to establish and improve the production of high charge states of enriched ^{54}Cr and ^{55}Mn ion beams. During the tests, plasma images were captured using a CCD camera to support the operation and enable real-time monitoring of the material consumption. Additionally, a hot screen was used to protect the ceramic insulators in the extraction system from metal deposition, thereby improving the operational stability of the ECRIS. The application of an optical emission spectroscopy to monitor the stability of metallic ion beams during the operation with the resistively heated ovens was also investigated. This contribution presents the operational experience, the intensities and stability achieved for the aforementioned elements. In addition, an update on a recent improvement involving a specialized oven preparation stand for better conditioning of the ovens is given.

Footnotes

Funding Agency

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