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Performance of the gas filled separator TASCA – the $^{48}\text{Ca} + ^{206,207,208}\text{Pb}$ reactions

J. Khuyagbaatar

Gesellschaft für Schwerionenforschung, Darmstadt, Germany

A large variety of nuclear reactions were used during the commissioning phase of the TransActinide Separator and Chemistry Apparatus (TASCA). Among those, reactions of ^{48}Ca beam with Pb targets with masses 206, 207 and 208 leading to nobelium isotopes played an important role not only to characterize and understand TASCA but also to establish a well known reference system for the upcoming superheavy element program.

In this contribution, data will be discussed which were obtained with a SHIP-type position-sensitive Si-strip detector and data acquisition system, as it was used during the commissioning experiments

The main characteristics of TASCA such as optimized settings, transmission for nobelium isotopes as the $^{48}\text{Ca} + ^{206,207,208}\text{Pb}$ fusion-evaporation products, suppression factors for other reaction products and primary/scattered beam will be discussed for both modes of TASCA operation, The high transmission mode (HTM) and the small image-size mode (SIM).

Mean charges of the nobelium ions were determined in the helium and hydrogen filling-gas of TASCA at different pressures around 1 mbar. The observed dependence of the mean charge of nobelium ions on gas pressure was evaluated quantitatively. In addition, the results on the observed mean charge of nobelium ions in mixtures of helium and hydrogen gases will be presented.