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Production of neutron-rich Rf isotopes by multinucleon transfer reactions based on 238U beam

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The production of neutron-rich Rf isotopes in multinucleon transfer reactions is investigated using the dinuclear system model with GEMINI++ code. The reaction 238U + 252Cf is more advantageous to generate neutron-rich Rf isotopes than 238U + 249Bk and 238U + 248Cf, because 252Cf has a larger N/Z ratio and neutron number. The influence of incident angular momentum on the production cross sections in the 238U + 252Cf reaction is investigated. The cross sections of primary products become larger with increasing incident energy, while the final yields of the unknown isotopes at 1.1Vc are slightly larger than at 1.05Vc and 1.2Vc. Hence, 1.10Vc is a suitable incident energy in the 238U + 252Cf reaction to produce Rf isotopes. Four unknown Rf isotopes, 264Rf, 266Rf, 268Rf, and 269Rf, are synthesized in the 238U + 252Cf reaction with cross sections 97.2, 31.1, 0.61, and 0.04 nb, respectively. Considering the beam intensity and thickness of the target, the counts per
day of those four unknown isotopes are 2724, 872, 17, and 1, respectively.

Abstract Type

Poster

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