

Influence of Isotope on Shell Effects of Pre-scission Particle Evaporation

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Abstract: The shell effects on the particle evaporation prior to fission for three Pb isotopes, ²⁰⁴Pb, ²⁰⁸Pb, and ²¹²Pb, as well as three Sn isotopes, ¹²⁸Sn, ¹³²Sn, and ¹³⁶Sn, are explored by a diffusion model. Calculations show that the magnitude of shell effects in the emission of particles changes with the neutron-to-proton ratio N/Z of these fissioning nuclei, and this change is affected significantly by the spin and excitation energy of the system. It is shown that high angular momentum enhances the dependence of shell effects on the N/Z while high excitation energy weakens such a dependence.

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Key words: isotopic effect, shell effect, pre-scission particle emission, Smoluchowski equation

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