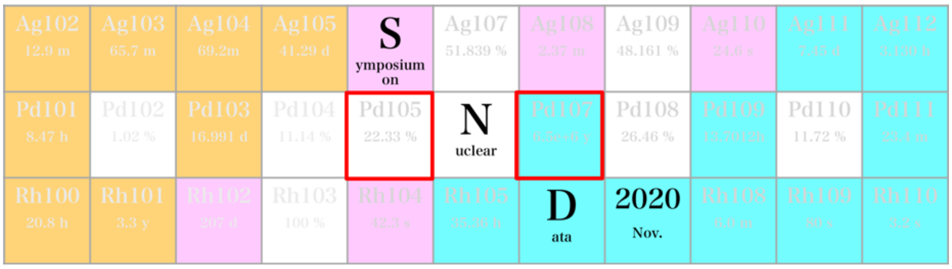

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Neutron emission during fission process by dynamical model/

Thursday, 26 November 2020 16:53 (1h 57m)

Through joint research by the Japan Atomic Energy Agency (JAEA) and Kindai University, it has become clear that the yield distribution of fission products (fission fragments) changes significantly depending on the neutrons emitted from the compound nucleus. In the so-called multichance fission (MCF) concept, fission takes place after emitting several neutrons. This revives the shell structure of a nucleus responsible for mass-asymmetric fission, thus change the fission-fragment mass distribution. The effect of MCF is particularly important to treat high energy fissions, such as ADS system which transmute long lived minor actinide nucleus by fission. Until now, the calculation was performed by combining the fission model calculation (Langevin equation) and a statistical model using a code such as GEF [1,2]. However, this method does not introduce neutron emission during the fission process.
In the present work, we have introduced the neutron evaporation during fission process in the Langevin model. For this, a change of potential energy in each neutron evaporation step is treated. Fission fragment mass distribution of $^{236-238}$U,$^{238-240}$Np, and $^{240-242}$Pu were calculated in the initial excitation energy range of E*=15-55MeV. The results show that the double-peak structure is maintained even at the highest excitation energies, and successfully reproduced the experimental data taken at the JAEA tandem facility [3-5].

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