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Fission Barriers of Compound Superheavy Nuclei[1]

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The dependence of fission barriers on the excitation energy of the compound nucleus impacts the survival probability of superheavy nuclei synthesized in heavy-ion fusion reactions. In this work [1,2], we investigate the isentropic fission barriers by means of the self-consistent nuclear density functional theory. The relationship between isothermal and isentropic descriptions is demonstrated. Calculations have been carried out for ^{264}Fm, ^{272}Ds, ^{278}Cp, ^{292}114, and ^{312}124. For nuclei around ^{278}Cp produced in "cold fusion" reactions, we predict a more rapid decrease of fission barriers with excitation energy as compared to the nuclei around ^{292}114 synthesized in "hot fusion" experiments. This is explained in terms of the difference between the ground-state and saddle-point temperatures.

[1] J.C. Pei, W. Nazarewicz, J.A. Sheikh and A.K. Kerman, Phys. Rev. Lett. **102**, 192501 (2009).
[2] J.A. Sheikh, W. Nazarewicz, and J.C. Pei, Phys. Rev. C **80**, 011302(R) (2009).

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