
A NEW SYSTEMATICS OF FRAGMENT MASS YIELDS FROM NEUTRON INDUCED FISSION OF ACTINIDES AT NEUTRON ENERGIES ABOVE 5 MEV.

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The mass and energy distribution in the proton induced fission of compound nuclei $^{234,236,237,239}\text{Np}$, $^{239,240,241,243}\text{Am}$, ^{245}Bk at proton energy $E_p = 10.3$ MeV; $^{234,236,237,239}\text{Np}$, $^{240,241,243}\text{Am}$ at proton energy $E_p = 22.0$ MeV; ^{233}Pa and ^{236}Np at $E_p = 7.4 - 30.0$ MeV have been measured by the spectrometry of coincident fission fragments with surface-barrier detectors.

The experimental information obtained have been analyzed in the framework of a new-developed method of multicomponent analysis, which is free from any assumptions about the shapes of the mass distributions of distinct modes [1].

The results of the analysis allowed to study the basic characteristics of distinct modes in their dependence on the incident particle kinetic energy and nucleonic composition of fissioning system.

Revealed regularities in the behavior of fission modes, such as isotopic invariance of fragment charge distributions from asymmetric fission of actinides [2], have been used for developing a new systematics of the pre- and post neutron emission fragment mass yields from fission of target nuclei from Th to Bk in reactions with protons and neutrons at kinetic energies from 5 to 200 MeV. This systematics reproduces main features of the experimental data with good accuracy and could be used as a basis for the calculations of fission product yields in reaction with neutrons in energy range 5 – 200 MeV in the interests of transmutation of minor actinides.

The systematics has been realized as the computer code PYF.

References

- [1] S.I. Mulgin et al., Phys. Lett., B 462 (1999) 29.
- [2] D.M. Gorodisskiy et al., Phys. Lett. B 548 (2002) 45.