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## Relations of isotope yields as an indicator of neutron fluxes in artificial rapid process

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The creation of heavy isotopes under extremal pulsed neutron fluences (of  $10^{24}$  n/cm<sup>2</sup> units) of artificial nucleosynthesis is investigated by means of the dynamical model taking into account the temperature decrease at the matter expansion. The first time the creation of isotopes with neutron excess up to mass  $A = 255$  was obtained and discovered in the Mike experiment [1]. An intensive (n, $\gamma$ )-activation of the irradiated <sup>238</sup>U target ensures the creation of neutron-rich isotopes up to <sup>257</sup>Fm. The rapid process is the consistent multiple neutron capture in the target (manufactured from the <sup>238</sup>U or more heavy/mixture isotopes as <sup>232</sup>Th, <sup>237</sup>Np, <sup>238</sup>U, <sup>242</sup>Pu, <sup>243</sup>Am). Creation of transuranium isotopes were investigated during the Plowshare program and some next nuclear tests: Anacostia, Kennebec, Par, Barbel, Tweed, Cyclamen, Kankakee, Vulcan and Hutch [2-5]. In the realized model of the nucleosynthesis (realized during the short time exposition -  $\sim 10^{-6}$  s) it were considered the sequential (n, $\gamma$ )-neutron captures by mono isotope <sup>238</sup>U target and binary (<sup>238</sup>U + <sup>239</sup>Pu)-variant for case of <sup>239</sup>Pu injection [6,7]. The model includes the temperature decrease during the adiabatic expansion with index  $\gamma = 1.5$  at the initial temperature  $\sim 20$  keV and linear velocity  $\sim 190$  km/s. Here we simulated the isotope yields for Mike, Anacostia, Barbel, Par, Vulcan and Kankakee experiments. The obtained results indicated on the approximately linear dependence for relations of the isotope yields relative to the obtained neutron fluence [8]. In the work we considered the pairs of neighboring isotopes with atomic masses  $A=245$  and  $244$ ,  $A=246$  and  $245$ ,  $A=247$  and  $246$ . The relation  $246/245$  (i.e., yields with masses  $A=246$  and  $245$ ) depending on the fluences is the most strong demonstrator of the linear dependence. The most strong confirmation of the roughly linear dependence was obtained for the pure <sup>238</sup>U target.

### References

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