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# Possibility of production of new superheavy nuclei in complete fusion reactions

Using available experimental data, the survival probabilities of excited uperheavies are extracted. Their increase beyond $Z = 114$ indicates the next proton shell closure at $Z$ between 120 and 126.

The perspectives of the production of new superheavy nuclei ($Z \geq 114$) in complete fusion reactions were investigated. The possible way to synthesize new superheavies is the use of the actinide-based reactions with projectiles heavier than $^{48}$Ca. At present, there are theoretical shell model calculations which predict a stability island close to the element $Z$=114 or 120, or 126 and $N$=184. Using these predictions of properties of superheavy nuclei
and the dinuclear system fusion model, the production cross sections in the hot fusion reactions $^{48}$Ca,$^{50}$Ti,$^{54}$Cr,$^{58}$Fe,$^{64}$Ni+$^{238}$U,$^{244}$Pu,$^{248}$C were calculated. It was shown that the cross sections are much larger with mass tables which predict the next double magic nucleus $^{A}Z$=$^{310}$126 beyond $^{208}$Pb. In this case there are possibilities to synthesize new superheavy elements with the present experimental setups.

The excitation functions of superheavy nuclei in hot fusion reactions $^{32,34,36,38}$S + $^{233-238}$U$\rightarrow$ 108 and $^{40,44,48}$Ca + $^{238}$U$\rightarrow$ 112, were predicted using the available predictions of nuclear properties.

## Are you a student, postdoc or an attendee from an "emerging"country and would like to apply for financial support?

yes

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