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## **SUPER HEAVY ELEMENTS: Synthesis and Properties**

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The existence of a region of hypothetical Super Heavy Elements (SHE) forming region (island) with high stability in the vicinity of the doubly magic nucleus  $^{298}114$  was postulated in the mid-1960s.

After about 30 years unsuccessfully attempts search for super heavy elements in nature or produced them in various reactions. They have synthesized in nuclear fusion of rare isotopes of trans-uranium elements and <sup>48</sup>Ca projectile. More than 52 neutron-rich nuclei including the isotopes of the new element 113-118 and their  $\alpha$ -decay products neutron-rich isotope of element 104-112 where produced in this reactions for the first time.

A significant increase in the stability of the SHN with the number of neutrons, their relatively high cross sections caused their fission barriers; scenario and decay characteristics of new nuclides appeared a direct proof of the existence of a region (an island) of stability among super heavy elements.

New nuclides with Z > 40% larger than that of Bi show an impressive extension in nuclear survival: the nuclear map have extended up to mass number 294, the 7th row of the Periodic Table have completed.

The prospects of studies nuclear and atomic properties of the heaviest elements are considered taking into account the new accelerator complex "Super Heavy Elements Factory".

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