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Superheavy elements of the D.I. Mendeleev's Periodic Table - Present and future

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The synthesis of super heavy elements (SHE) with atomic numbers 113-118 has been achieved in the ^{48}Ca -induced reactions. The seventh period of the Periodic Table has been completed. Unique data on the nuclear-physical properties of isotopes of the new elements have been obtained. Pioneering experiments on the chemical properties of elements 112 (Cn), 113 and 114(Fl) have been carried out [1].

The discovery of an Island of stability of SHE has brought up a whole new series of questions:

- Can there be nuclei heavier than synthesized super heavy nuclei?
- Is this newly discovered "island of stability of SHE" the last one on the map of nuclides?
- Where is a limit of the Periodic Table?
- To what extent the chemical properties of SHE resemble those of their lighter homologues? And many others.

As a response to this challenge, a new project has been launched at FLNR (JINR) – "SHE Factory" [2], comprising: the construction of a new heavy ion accelerator produced stable and radioactive isotopes with masses $A = 10\text{--}100$ and intensities up to $10\ \mu\text{A}$. The new laboratory will be equipped with target materials, new separators and detectors for the study of the nuclear, atomic and chemical properties of the new elements.

1. Yu Ts Oganessian, S N Dmitriev, "Synthesis and study of properties of superheavy atoms. Factory of superheavy elements", *RUSS CHEM REV*, 2016, 85 (9), 901–916 DOI: 10.1070/RCR4607
2. Sergey Dmitriev, Mikhail Itkis and Yuri Oganessian, Status and perspectives of the Dubna superheavy element factory // *Proceedings of the Nobel Symposium NS 160, EPJ Web of Conferences 131 (2016) 08001*.

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