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Selection of parameters of the input window of a gas-filled separator operating at an increased intensity of a heavy ion beam

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The detailed study of properties of superheavy nuclei (SHN) in the experiments with the complete fusion reactions induced by the 48Ca projectile on actinide target nuclei, which lead to 112≤Z≤118 nuclei, implies the use of heavy ion (HI) beams with the intensity significantly higher than the one used earlier in the discovery experiments with the 48Ca beam [1]. Synthesis of SHN with Z>118 implies the use of the heavier than 48Ca beam particles (50Ti, 54Cr etc.). In this lecture, the durability of the entrance window working at high the intensity of heavy ion beams is considered. The durability of the entrance window is estimated as the result of the action of an intense heavy ion beam, such as sputtering, radiation damage and temperature [2]. The assessments of these actions that determine the durability of the entrance window are discussed. The temperaturstrong texte of the entrance window is calculated as a function of time in the conditions of its pulsed heating by means of a heavy ion beam, followed by radiative cooling with radiation emitted from its surface. The entrance window temperatures are calculated for heavy ion beams, such as 48Ca, 50Ti, 54Cr and 58Fe, with their intensities expected for the DC-280 accelerator. With these calculations of the temperature dependences against the time of the beam action the optimal parameters of the entrance window operation is chosen. Literature. 1. Yu.Ts. Oganessian, V.K. Utyonkov, et. al. “Superheavy nuclei from 48Ca-induced reactions” //Nucl. Phys. A, 2015, vol. 944, pp. 62–98. 2. J. Yntema and F. Nickel, “Targets for heavy ion beams,” in Experimental Methods in Heavy Ion Physics, Lecture Notes in Physics, 1978, vol. 83, pp. 206-235.*

Primary author(s) : Mr. IBADULLAEV, Dastan

Co-author(s) : Mr. SAGAIDAK, Roman (Nikolaevich)

Presenter(s) : Mr. IBADULLAEV, Dastan

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