

Li solution of the steady-state problem of tokamak in the light of the last experimental results

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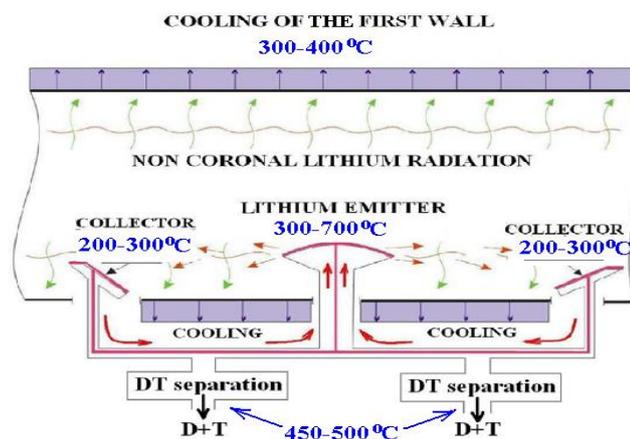
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Recent experiments made on tokamak T-11M [1] for the purpose of full-scale simulation of behavior of lithium, injected into the peripheral (SOL) region of tokamak for protection its first wall from the direct plasma-contact, forced us to bring some correction in the temperature operation limits of individual elements of a closed lithium circuit that implements this protection in the steady-state mode of tokamak. Its main elements are presented in figure: the lithium emitter and collector on the basis of capillary porous structure (CPS), the first wall with of Li-coated steel, and the system of D,T recovery from the lithium stream.



It was found that the first wall of the steel chamber coated during discharge by lithium and heated over 350-400°C reflects to the plasma cord almost the whole entire flow of H⁺ and D⁺ which falls on the first wall. Thus the first wall can play role of a "mirror" in relation to both of them (and T in future) and prevent their gradual accumulation in the chamber of the tokamak. It is proposed to carry out the capture of D⁺ and T⁺, and its following removal from the camera by using of the liquid Li surface of CPS collectors in the temperature range of 200-300°C. To control the temperature of the collectors in the specified range assumed to apply both hot water and the recently developed cooling method by the dispersed gas-water flow formed by the special spray generator.

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[1] A.N.Shcherbak, S.V.Mirnov e.a. 44 EPS Conf. on Plasma Phys. (2017, Belfast), **P5 112**