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FTP/P1-01: Investigation and Testing of KTM Divertor Model on Basis of Lithium CPS

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Lithium capillary porous system (CPS) as power divertor receivers tiles are proposed to study at the tokamak KTM. Trial start-up of KTM tokamak was done in September, 2010. The main goal of work is creation and testing the model of Li divertor (MLD) at KTM condition. As a result of project realization the Li-technology will be developed and Na-K cooling module of lithium divertor for tokamak KTM will be designed and tested. The construction of MLD, development of process for preparation, protection, clearing and rehabilitation of lithium CPS surfaces in tokamak conditions was completed. At the first stage the test MLD external systems, and test of MLD analog without temperature stabilization system are planned to be done during this year. Second stage will include the adjustment tests of demonstration models of KTM tokamak divertor using reduce plasma parameters. Research of lithium influence on the parameters of plasma discharge and specific power load on the plasma facing components; optimum operating modes definition of the lithium divertor will be done after KTM physical start-up.

In order to justify the use of lithium divertor module the experiments were carried out to study sorption characteristics of lithium CPS against hydrogen isotopes. Goal of present work is to assess parameters of hydrogen isotope interaction with lithium CPS under conditions modeling the operation of the tokamak KTM modes to regulate pre-start modes of working gases input. It is necessary to know also the influence of neutron irradiation on parameters of hydrogen isotopes interaction with Li CPS as well as tritium generation, accumulation and release by Li CPS under neutron irradiation for future Li technology application on fusion power reactor. Therefore, we carried out investigations of hydrogen isotopes interaction with Li/Li CPS under reactor conditions using reactor IVG-1M of NNC RK. The gas absorption technique was used to study hydrogen/helium isotope interaction with the samples of lithium CPS. This work is carried out jointly Kazakhstani- Russian organizations in framework of the ISTC project K-1561 with ENEA collaboration.

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