

## Recent Progress of PFMC R&D and Testing Facilities toward Fusion Reactor in China

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In the past two years, a series of new national programs have been launched to advance the technology of plasma-facing materials and components (PFMC) toward fusion reactor in China. These programs cover the R&D of novel materials, advanced fabrication of blanket and divertor, as well as the development of relevant testing facilities.

Novel W alloys combined with ODS-Cu heat sink materials have been developed for divertor application. Mockups made by these new materials are designed to tolerate continuous divertor-relevant particle and heat flux in a timescale of day/shot. As an alternative solution, liquid lithium first wall is proposed, involving more sophisticated MHD effect, as well as novel 3D printing technology for innovative capillary porous liquid-solid hybrid system design.

As to the blanket R&D, Chinese modified RAFM steels are being developed together with advanced water-cooled blanket design. A systematic investigation of the thermo-mechanical properties as well as the in-service performance of these RAFM steels is ongoing. Mockups with cooling channels and tubes informed by the latest blanket design are additively manufactured for testing. Finally, a half-scale blanket module with W armor on RAFM steel are fabricated.

In addition, PFMC testing infrastructure has been actively developed in China, including a new superconducting linear plasma machine and a high heat flux test device in the Comprehensive Research Facility for Fusion Technology (CRAFT), one of the new Chinese National Major Scientific and Technological Facilities. The linear machine can deliver continuous  $\sim 10^{24} \text{ m}^{-2}\text{s}^{-1}$  plasma flux for more than 24 hours. The high heat flux test device has a total power of 860 kW and is capable of testing full-scale modules of blanket and divertor.

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