

## **Related Technologies of Fusion Reactor Developed in China**

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Fusion research nowadays in the world has been focused on the R&D of future fusion reactor technologies, such as technologies of large scale superconducting magnets, RF/NBI heating and current drive, blanket and divertor, plasma control and diagnostics, tritium recycling and radiation resistant materials. Some key technologies have been developed in China by the projects of HT-7 in operation and EAST being building in ASIPP (Institute of Plasma Physics, Chinese Academy of Sciences). By HT-7 superconducting tokamak, the technologies of long pulse discharges for plasma initiation with low loop voltage, wall conditioning, plasma facing material, non-inductive current drive and heating, plasma control and data acquisition and processing have been developed very well. The R&D programs of EAST have been quite successful, which have been especially focusing on the superconductivity engineering development, such as design, fabrication and test technologies of large scale magnets and cable-in-conduit conductor. A multi-element doped graphite and thick gradient SiC coatings on CBM have been developed as plasma facing materials of the EAST device. Detailed investigation of the composition has been done. High-Z materials, e.g. Mo and W, and functionally graded materials for PFM have also been studied in China.

As a primary candidate of structural materials of blanket, the Chinese version of the RAFM (Reduced Activation Ferritic-Martensitic) steels, e.g. CLAM (China Low Activation Ferritic-Martensitic) steel, are being developed in ASIPP. The current related activities on CLAM steel have covered smelting, heat treatment, fabrication of steel and the effects of irradiation by plasma and corrosion by liquid lithium-lead eutectic. Two types of tritium breeding blanket are being developed to investigate the fabrication technology, working performance, construction of liquid LiPb experimental loops, fabrication of blanket mockup and development of test blanket modules. In addition, a series of activities related to blanket technology such as neutronics integral experiments to test tritium breeding, neutron breeding and multiplication, nuclear fuel breeding and neutron shielding, tritium production experiment using a fission reactor, fusion-hybrid related material studies have been also carried out.