IFERC Newsletter

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Meeting

5th Joint Technical Coordination Meeting (JTCM-5)

The 5th Joint Technical Coordination Meeting (JTCM-5) was held in Eurofusion at the Max-Planck Institute for Plasma Physics, in Garching, Germany on 3rd Nov. 2015. Participants included 10 scientists from the EU-IA (Implementing Agency) (4 by video-conference (VC)), 12 from JA-IA (1 by VC) and 3 from the IFERC PT (Project Team). Discussion topics included EU/JA collaboration on R&D (SiC/SiC composites, JET-ILW analysis, breeding materials), database on structural materials and plan of DEMO Design R&D in the extension period of IFERC project.

Highlights of DEMO R&D presentations:
Compatibility of SiC_f/SiC composites with Li-Pb has been examined with rotating disk equipment capable of exposing samples with a wide range of parameters such as relative flow velocity, temperature and chemical environment. At exposure times of 1000 h, the transubstantial layer (T-layer) thickness of NITE SiC/SiC composite was about 3.9 times thicker than that of CVD SiC. In parallel, corrosion experiments utilizing the large rotating disk corrosion equipment (ENEA) are ongoing.

Observation of JET-ILW tiles and dust was carried out with imaging plates and microscope. Many tungsten dust particles with acute angles were observed. A typical diameter of dust particles was less than 100 µm. Beryllium deposited layers on tungsten film were observed. The amount of detected tritium was about 0.1 GBq/g.

Fundamental granulation technology for beryllides has been established; this technology combines a plasma sintering method with a rotating electrode method using a plasma-sintered electrode. After a survey of new potential structural composition other than Be-Ti beryllide, Be-V and –Zr beryllides were selected. Those prototypic pebbles were successfully fabricated directly by the rotating electrode method.
Sintered $Li_{2+x}TiO_{3+y}$ pebbles with single phase and up to 5 µm of grain size were established by the results of the optimization study.

DT neutron irradiation was carried out for evaluation of tritium release properties using $Li_{2+x}TiO_{3+y}$ pebbles. Optimized pebbles with up to 5 µm of grain size exhibited good tritium release behavior from the viewpoint of not only chemical form of released tritium but also of the tritium recovery rate.

Development of the EUROfusion database for DEMO relevant structural, armour and functional materials started. Gap analyses between the current design code philosophy and the RAFM (F82H) database are underway by referring to new material requirement stated in JSME, ASME, RCC-MR Grade91 specification in JSME, ASME, RCC-MR. Re-evaluation of F82H data of 3 large batches continued, with specific emphasis on fatigue, creep, and creep-fatigue. Acquisition of new data (BA07, BA12) continued. An irradiation database is also under re-arrangement by referring to material specification for fuel cladding.

Collaboration was agreed on a material database – with design rule issues as the common issues. JP-IA is positive to collaborate on acquiring the missing irradiation data. It is important to identify the issues on which JP and EU IAs can share and collaborate along with the activity on common database; for example, SSTT standardization, Irradiation creep evaluation to acquire isochronal stress-strain curve, and true-stress true strain analyses on irradiated material. It is also important to think about database expansion related to fusion neutron irradiation effects. These collaborative activities are considered to be continued after 2017, as it will be difficult to "complete" the common database by 2016, and it will be beneficial for both sides.

Ductility loss observed in irradiated F82H was summarized by analysing true-stress true strain curve.

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