

IFERC Newsletter



IFERC-N-2012-1~6 (No. 4, 29 February, 2012)

International Fusion Energy Research Centre, Rokkasho, Aomori 039-3212, Japan

REC Activity

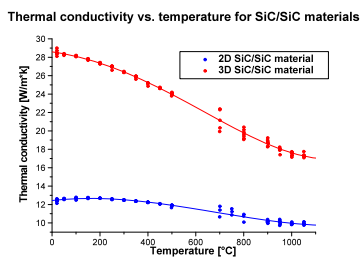
Preparatory Working Group has been set up to create an overall plan for the ITER Remote Experimentation Centre



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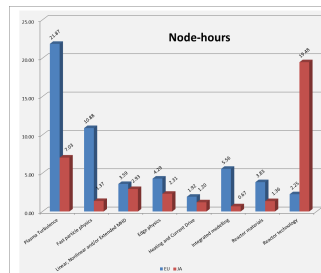
DEMO R&D Activity

Determination of thermal conductivity of SiC_f/SiC composites



CSC Activity

1st Standing Committee Selected Proposals



Meetings

3rd Technical Coordination Meeting of DEMO Design Activities and 10th Workshop on DEMO R&D in BA Activities



Visit

Visitors to the IFERC from KEPCO

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Staff Corner

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IFERC-N-2012-1 (No. 4, 29 February, 2012)

REC Activity

Preparatory Working Group has been set up to create an overall plan for the ITER Remote Experimentation Centre

The ITER Remote Experimentation Centre (REC) is one of the sub-projects in IFERC. The REC will be developed as a remote control room for experimental campaigns preparation and data analysis for ITER. In order to create an overall plan for the REC, four members from each party were nominated for the Preparatory Working Group (PWG) under the chairmanship of the IFERC Project Leader in collaboration with the STP project.

The PWG had two meetings in January and February. During the 1st PWG meeting, the roles of the PWG and a list of items were presented by the chair to clarify the critical issues and to establish common understanding. Then the preliminary overall plan was presented by the JA member. In the 2nd PWG meeting, the EU members gave technical presentations on "ITER CODAC system" and "Remote Participation". The required functions and technical specification of items for REC were discussed in detail. The technical presentation on "Remote Experimentation System of JT-60SA" will be performed by JA member at the 3rd PWG meeting to be held in March.

Following the constructive discussions in the meetings, the PWG will produce an interim report, which it will present at the 10th IFERC Project Committee to be held on 19-20 March 2012 at Rokkasho.



IFERC-N-2012-2 (No. 4, 29 February, 2012)

DEMO R&D Activity

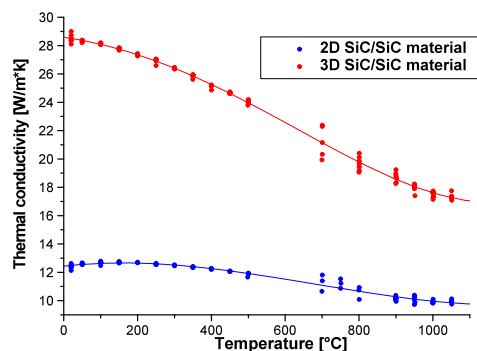
Determination of thermal conductivity of SiC_f/SiC composites with 2D and 3D textile architecture

Silicon carbide ceramic matrix composites have been studied for use in structural and functional applications because of their excellent oxidation resistance, high mechanical strength at elevated temperature, high corrosion resistance, high thermal conductivity and high thermal shock resistance. Important factors governing the use of SiC_f/SiC at high operating temperatures or in severely fluctuating thermal environments include thermo physical properties such as thermal diffusivity, specific heat and thermal conductivity.

At ENEA Frascati laboratory we have extended the measurement of the thermal conductivity of CVI (Chemical Vapour Infiltration) SiC_f/SiC up to 1000°C in the transverse direction (though-thickness conductivity). In the figure are shown the thermal conductivity of the 2D and 3D textile architectures as a function of the temperature. The results of the measurements show that thermal conductivities decrease from 28.5 to 17.2 W/m K for the 3D textile architecture and from 12.6 to 9.8 W/m K for the 2D textile architecture with increasing from ambient temperature to 1000 °C. This indicates that the textile architecture type affects significantly the thermal conductivity. In fact, the thermal conductivity of the 3D textile architecture is around the double of that 2D in the whole arc of the temperatures. The increase of the thermal conductivity in the textile architecture 3D in comparison to that 2D is imputable to two factors, the presence in the configuration 3D of fibres along the transversal direction and also from a smaller porosity in the configuration 3D estimable in a 4%. The decreases of thermal

conductivities in a specific textile architecture with the increase of the temperature is due to the increase of phonon-scattering, while the decreases of the thermal conductivities with the increase of the porosity is controlled by phonon transport that relies on the propagation of thermal vibrations through the crystal lattice across a temperature gradient. This phonon transport is reduced in presence of point defects (e.g., vacancies) and extended defects (e.g., dislocations). The pores are large defects and thus have a strong effect on thermal conductivity because of a decreased mean free path for phonon transport as a result of an increase of phonon scattering at pores.

Thermal conductivity vs. temperature for SiC/SiC materials

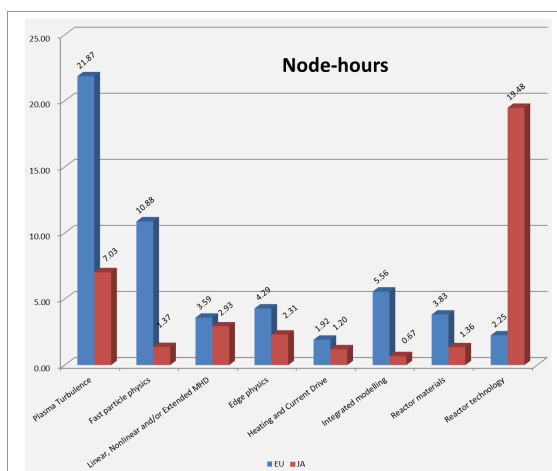


IFERC-N-2012-3 (No. 4, 29 February, 2012)

CSC Activity

1st Standing Committee Selected Proposals

The 1st meeting of the Standing Committee for the CSC (StC) was held on 20th and 21st February at Rokkasho. The members of the StC met to evaluate the proposals received in the Call launched in October 2011, that had been reviewed by internal and external referees. The StC allocated node-hours for the use of Helios computer to 58 proposals for the first cycle (four proposals were not selected). The details are shown below. The first cycle should start from 9th April. The StC discussed with the CSC management the issues such as queue management, priorities, accounting, and visited the supercomputer centre. This call has been extremely popular among the EU and JA fusion modeling communities, with the time requested in the proposals exceeding the total available compute time by a factor of three. The StC will meet again in Barcelona in September 2012 to evaluate the results of the projects, and to prepare the second call.



StC members with N. Nakajima PL and J. Noe CSC Leader in the CSC building (21st February, 2012)

IFERC-N-2012-4 (No. 4, 29 February, 2012)

Meetings

3rd Technical Coordination Meeting of DEMO Design Activities and 10th Workshop on DEMO R&D in BA Activities

The 3rd Technical Coordination Meeting (TCM-3) of DEMO Design Activity (DDA) and the 10th Workshop on DEMO R&D in the BA activities were held at the Kashiwa campus of the University of Tokyo on 1-3 February 2012. The Meeting involved 52 participants in total; 5 from IFERC-PT, 24 from the JA home team including 1 by videoconference, 23 from the EU home team including 11 by videoconference. This meeting was the second joint meeting of the DDA and the DEMO R&D and was very successful. One year had passed since the DDA was established under the IFERC, and the progress accomplished was presented. The detailed results of the first year of DDA

will be described in the annual report to be prepared in the near future.

The main contents of the meeting are summarized as follows: The presentations by both of EU and Japan sides have covered 1) the status and plans of the implementations of activities, 2) the status of bench mark tests of system codes and proposal of cost model, 3) issues of pulsed tokamak fusion reactors, 4) the status of divertor research, 5) blanket research and 6) remote maintenance research. In addition, the system integration of JT-60SA construction was reported as STP-DDA collaboration, and the latest results of the R&D tasks were reported from EU and Japan in sessions of the DEMO R&D.

The results from both JA and EU system codes were in agreement about the physical model. The addition of the cost and the engineering models to both system codes will be done in the next step. The heat removal from the divertor is highly critical in the fusion power plant. Therefore, it was confirmed that it is important for the DDA to investigate the innovative divertor concepts as well as the conventional divertor. Concerning the blanket design and the maintenance method, exchanges of information and discussions continued between both home teams. Various concepts of DEMO reactors were discussed and as a result, it was proposed that some typical concepts would be further investigated over the coming months. The TCM-3 was closed with summary and the next TCM (TCM-4) is planned to take place in Garching later in 2012.

The 10th Workshop on DEMO R&D in the BA Activities was held on 3 February. The seven members from EU and Japan of a group nominated to perform a peer review of the DEMO R&D programme were invited to attend this workshop. The purpose of the peer review is: 1) To review the R&D activities performed so far and to assess the level of completion of the goals as set in the 1st Steering Committee in Tokyo on 21 June 2007, 2) To review the needs in R&D identified by the DEMO Design Activities, and 3) To make recommendations to the Project Leader and Implementing Agencies regarding the future directions of the DEMO R&D programme, and on how to improve the integration of the activities. Research facilities and equipment prepared in EU and Rokkasho as well as fruitful R&D results so far were presented by the EU/JA participants for the existing five areas (SiC/SiC composites, Tritium technology, Materials engineering on reduced activation ferritic/martensitic steel, and Advanced neutron multiplier and tritium breeders). Very active and invaluable Q&A and discussions were held until late into the evening, in particular, about the future plans which include new R&D subjects on the fusion blanket and divertor. An interim report of the peer review will be prepared for discussion in the 10th IFERC Project Committee meeting to be held in Rokkasho on 19-20 March; and the final report will be finalized by the end of May in 2012.



IFERC-N-2012-5 (No. 4, 29 February, 2012)

Visit

Visitors to the IFERC from KEPCO

We welcomed two visitors from KEPCO (Kansai Electric Power Company) to IFERC-DDA on 11th January 2012. Mr. Yamasaki

Satoru and Mr. Akamatsu Hirokazu were very interested in the ITER and the BA activities. After explaining the present status of DEMO design activity in the IFERC, we arranged a short tour to the facilities of R&D activities and our new CSC Super Computer. They were impressed to find more researchers working at the Rokkasho site than they had expected before this visit. They said that they will watch future developments of the fusion research. Although the fusion cannot provide any electric power at present, we have been encouraged by their interest in fusion research.



From left, Mr. Akamatsu, Mr. Yamasaki, Mr. Okano (DDA-L) and Mr. Hiwatari from (CRIEPI)

IFERC-N-2012-6 (No. 4, 29 February, 2012)

Staff Corner

Jacques Noé looks back at the year

At this time a year ago, the CEA had just accepted my application for the place of CSC leader. At the time, I barely knew what the Broader Approach was. I had not been involved in anything related to fusion. I had never been to Japan and the only thing I knew about Rokkasho was that there is a lot of snow in winter and when the snow is gone, there are bears all around. Fortunately, the IFERC site is surrounded by fences. In a sense, I was glad of that. Had the IFERC center been near Tokyo, a lot of people would have applied for the place and I would not have stood any chance. As is, I was the only applicant. So they were almost obliged to take me. Still, the fact that I had been working on supercomputers for 25 years did help.

One of the remaining problems was to convince my wife. But she is usually ready to follow me. I did not tell her all the details. The difficult part was that we had to leave our children in France. They were 22 and 24 and continuing their studies so they could not follow us. Then, in March, Japan suffered from the drama caused by the earthquake, the tsunami and the Fukushima power plants. We considered whether we should still come. Eventually, we decided to continue. We do not regret our decision. I first came to Japan in mid-May (PRM-4), then again with my wife beginning of July. Eventually we moved in at the end of August. Since then, we have installed ourselves in Rokkasho. My wife is practicing lots of sport and other activities. She is meeting plenty of people and is always welcome by everybody. The only sore spot is the Japanese language. We are trying to learn it but it is difficult and it requires plenty of regular work.

We have tried to do some gardening:



But recently we have stopped our efforts:



We are now waiting for the snow to melt to continue. I heard some people say that the amount of snow this year is record breaking. It was not necessary to go that far to impress us. We now look forward to the cherry blossom. People say it is beautiful and the trees are white with flowers. White is a popular colour around here.