PREFACE

SIXTEENTH INTERNATIONAL CONFERENCE ON FUSION REACTOR MATERIALS

The Sixteenth International Conference on Fusion Reactor Materials (ICFRM-16) was held October 20–26, 2013, at the Capital Hotel in Beijing, China. The ICFRM conference series is the major international forum for information exchange about materials to be used in future fusion power systems. The purpose of ICFRM-16 was to assemble the international fusion materials community for the presentation and discussion of current research and development results on the science and technology of fusion reactor materials for ITER, other near-term experimental plasma devices, and long-term fusion power sources.

The past 30 years of focused materials research and development for fusion applications has established a substantial technology base in support of the promise of fusion energy. The ongoing construction in France of a burning plasma experiment, ITER, has increased international attention on this area. The technology of fusion energy is rapidly maturing, and recent progress in research devoted to fusion reactor materials is a major contributor to this effort. In addition, materials research for fusion continues to be at the forefront of materials science.

The scope of ICFRM-16 ranged from fundamental materials science to predicting and optimizing in-service materials performance and was delivered in a mix of invited and contributed oral and poster presentations. A new focus at ICFRM-16 was the high level of attention devoted to the development and qualification of tungsten for use in fusion. This was of course driven by the needs of ITER and demonstrated the challenges associated with this notoriously difficult material. Continuing trends were the strong focus on developing the ferritic/martensitic low-activation steels needed for the ITER test blanket modules and DEMO, work on oxide-dispersion-strengthened steels to open up the operating temperature "window" available for use of steels, and the large effort on modeling and computational materials science.

Before ICFRM-16, Short Course on Foundations of Fusion Materials was held on Sunday, October 20, 2013, at the same venue as ICFRM-16. Eight top-level scientists gave lectures on the foundation of fusion materials. The goal of this school was to present a comprehensive introduction to fundamental principles and relevant technical issues important to the development of materials for fusion reactors.

ICFRM-16 was the latest in the ICFRM conference series. ICFRM-1 was held in Tokyo, Japan, December 3–6, 1984, with 264 participants from 15 countries. Interest and participation in the conference series has continued to grow, and the size and scope of the conference have increased with time. The previous conference, ICFRM-15, was held in Charleston, South Carolina, October 16–22, 2011, with 415 registrants from 23 countries. ICFRM-16 attracted 392 registrants from 25 countries. The largest contingents were from China ($\sim$166), Japan (56), the United States (40), and Germany (33). Delegations of 20 or fewer came from the other countries. The final program comprised 95 oral presentations and 430 papers presented in poster sessions.

The scope of ICFRM-16 was broad and accommodated papers on the wide range of materials and technology topics of interest to near-term machines, ITER, DEMO, and longer-range fusion concepts. As a result, the proceedings of ICFRM-16 encompass a comprehensive range of materials science and technology data and experience relevant to fusion system designers as they seek to construct current experiments such as ITER and design innovative solutions for future energy systems.

The increasing number of papers devoted to fusion nuclear technology has led to one change in the publication of papers presented at ICFRM. Following from ICFRM-15, the papers accepted for publication have been directed to two journals. Those manuscripts that focus on materials science and development were submitted to the *Journal of Nuclear Materials* (*JNM*), which has traditionally been the journal associated with ICFRM. Manuscripts that dealt more closely with fusion technology issues have been submitted to the journal *Fusion Science and Technology* (*FS&T*). This split publication has enabled the organizers to relax the rather stringent page limits that were previously required for each paper. This should enhance the value of the papers to both the fusion community and the broader materials science community.

Conducting a well-organized conference and preparing high-quality proceedings are only possible with the collaboration, diligence, and efforts of many individuals. The organizers would like to express their deepest appreciation to the authors, the reviewers, the participants, and the members of the various committees for their many contributions. Our special thanks go to the members of the local committees and the supporting administrative staff from *FS&T* and *JNM*.

ICFRM-17 is being planned for October 2015, in Aachen, Germany, with Professor Christian Linsmeier as General Chairman. We look forward to seeing you in Aachen.

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