

MATERIALS SCIENCE & TECHNOLOGY



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MSTD Newsletter September 1999

Message from the Chair



Dave Senor, Chair

Dear Colleague...

At the conclusion of the recent ANS Annual Meeting in Boston, I had the privilege of becoming Chair of the Materials Science and Technology Division. I look forward to the next year as we work to continue the process of revitalizing the Division. Many thanks are due our Past Chair, Jim Tulenko, for his leadership during the last year, and congratulations are in order for his recent election to the ANS Board of Directors. Our Division now has two very active members on the Board, Bob Seidel and Jim, and we should view this as an opportunity to have our opinions heard at the Society level. Please do not hesitate to contact Bob or Jim if you have a question or constructive comment regarding Society governance.

With regard to technical programming, the Boston meeting was the most successful showing for the MSTD in several years. We sponsored three very well attended ses-

sions with a total of 16 papers (read the report on page 6). The sessions fit in well with programming provided by other Divisions within the Society and a significant number of attendees were present from specialties outside the nuclear materials community.

This is exactly the sort of programming we need to broaden the appeal of the MSTD and ensure its continued vitality. About two years ago, we developed a plan to provide fuels-related programming at the Winter Meetings and non-fuels programming at the Annual Meetings (unless other factors like location or timing suggested otherwise). We've used this thematic approach to provide related sessions and to select topics that are of interest to members of other ANS Divisions.

Our goal is eventually to grow these related sessions into topical meetings. The Boston meeting session topics on accelerator materials and nuclear methods in materials research meet the criteria listed above and appear to be good candidates for sessions that might be able to evolve into at least portions of topical meetings. These topics will be repeated at future ANS Meetings to gauge the level of interest over time (accelerator materials at the 2000 Annual Meeting and nuclear methods at the 2000 Winter Meeting).

There are a number of other special sessions planned for the next three national meetings, and I encourage you to contribute and/or

solicit papers to help make them successful.

One of the most important activities of the ANS and the MSTD is fostering education. To assist the MSTD this arena, the long-vacant position of University Liaison recently was filled. Dr. Carl Beard, of the University of Texas, was appointed to serve in this important role.

Carl is planning a number of activities to encourage student involvement, including interfacing with ANS student branches to publicize ANS and MSTD activities, sponsoring ANS student conferences, organizing technical sessions featuring student research at national meetings, coordinating campus visits and seminars on nuclear materials topics, working with the Scholarship Committee to manage the MSTD Schumar scholarship, and fostering a network to identify employment opportunities. One of

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Message from the Chair

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Carl's principal goal is to extend the membership base of ANS and MSTD beyond our traditional stronghold of nuclear engineering departments. I wish Carl luck in his new role, and encourage anyone interested in contributing to MSTD-sponsored educational activities to contact him (voice: (512) 232-6094; or email: cbeard@mail.utexas.edu).

The American Nuclear Society continues to re-invent itself, and the latest round of recommended changes (referred to as Infrastructure III) dealt with the structure of national meetings, planning of topical meetings, and structure of the professional divisions. Jim Tulenko represented the MSTD at the Infrastructure III meeting in Washington, DC, in March. Most of the proposed changes are oriented toward increasing the viability of the national meetings, and include proposed financial incentives for division programming at national meetings, modifications to the meeting planning process to better coordinate national and topical meetings, and improvements in national meetings to improve the experience for attendees.

The spirit of the proposed changes was supported by most division representatives at the Professional Divisions Committee and National Program Committee meetings in Boston although there was significant differences of opinions on the details. By and large, if the changes are adopted by the Board in something like their present form, they appear to have the potential to improve certain aspects of meeting planning and execution without significant disruption to the manner in which the divisions operate. There undoubtedly will be further Society infrastructure changes in the future; we will continue to be involved in this

process and keep you informed of developments.

Finally, nominations are needed for the 2000-2001 MSTD Officer and Executive Committee elections. The final slate of candidates is due to ANS-HQ in November. The new officers will begin their terms at the conclusion of the 2000 ANS Annual Meeting in San Diego next June. There are five Executive Committee positions open, in addition to the Secretary/Treasurer and Vice-

Notes from MSTD Past Chair

As my term as the MSTD Chair has come to an end, I would like to review the accomplishments and significant current activities of the past year. At a time when the ANS is suffering severe challenges, MSTD was one of only four divisions to show an increase in membership. In percentage and total gain, MSTD ranked second only to the D&D Division. It tells a great deal about the interest and role of materials in our profession that we are increasing our membership while others continue their decline. Additionally, our foreign membership continues to grow.

An excellent newsletter was turned out by Bobby Seidel this spring to inform our membership of our activities. We have added a new program chair (Brent Lewis) who has been fantastically active, bombarding me with E-Mail and has planned exciting programs for Long Beach and San Diego. This fall in Long Beach we will have our MSTD Biannual Honors and Award luncheon. I hope to see as many of you there as can make it.

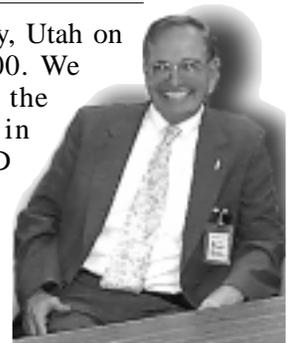
We are actively involved in co-sponsorship with the Fuel Cycle Division of the International Conference on Light Water Reactor Fuel Performance to be

held in Park City, Utah on April 9-13, 2000. We will be hosting the next meeting in 2002 and MSTD is currently looking for an exciting site for the meeting. Many division members are involved in hosting the second Plutonium Futures conference in Santa Fe, NM in mid-July 2000.

Chair/Chair-Elect positions. Executive Committee members serve three-year terms, while Officers serve one-year terms.

The Nominating Committee is chaired by Jim Tulenko. Please contact Jim if you are interested in serving as a MSTD Officer or Executive Committee member, or if you would like to nominate someone. We are particularly interested in expanding the international and industrial representation on the Executive Committee. There is plenty of work to go around, so I encourage you to get involved. ☼

David J. Senor



*Jim Tulenko,
Past Chair*

I know that the leadership of the MSTD Division will only improve as Dave Senor takes over as Chairman and continues to maintain MSTD as a cutting edge division. I appreciate the support of the MSTD members who have enabled me to represent the division on the Board of Directors for the next three years. There were only four new board members elected.

It is positive when MSTD can have a voice in the direction of the society and I look forward to working with Dave in the coming year to see that our voice is heard. I thank everyone for making 1998-99 a great year and ask for your continued active support. ☼

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Calls for Papers

International Topical Meeting on Light Water Reactor Fuel Performance

Inn at Prospector's Square
Park City, Utah
April 10-13, 2000

The focus of this triennial meeting continues to be light water reactor (LWR) fuel and core materials behavior during normal operation, operational transients, accidents, and long term storage. The results of both analytical studies and experimental measurements are welcome. Topics include

- Fuel, cladding, and structural-material state and property changes caused by burnup, radiation damage, and corrosion;
- Experiences with high burnup fuel designs and cladding materials;
- Fuel failure mechanisms;
- Advanced fuel designs that are more robust, cheaper, better suited to long term storage, and more proliferation resistant;
- Mixed oxide (MOX) fuel designs and irradiation experience;
- Defected fuel performance and fission product release and transport;
- Advanced control/absorber rod designs and irradiation experience;
- LWR fuel behavior during reactivity-initiated accidents (RIAs);
- Behavior of spent fuel during pool and long term storage; etc.

The meeting website:
<http://id.inel.gov/conference/fuels2000/>

Deadlines:
1500 words Summaries,

September 16, 1999; Full-length papers, December 3, 1999.

Contact: Philip MacDonald, Technical Program Chair. Phone: (208) 526-9634; Fax: (208) 526-2930; email: pem@inel.gov

Eight International Conference On Nuclear Engineering, ICONE-8

Hyatt Regency Hotel
Baltimore, Maryland, USA
April 2-6, 2000.

Papers are invited for publication and presentation on a variety of topics related to "Nuclear Energy in the New Millennium". ICONE is a comprehensive international conference on nuclear engineering which features 400-600 peer reviewed full-length papers in 10 technical tracks. ICONE-8 in addition to full-length papers also accepts "for presentation only" abstracts in Tracks 1, 2, 4, and 10.

1. Plant Operations and Maintenance
2. Major Component Reliability and Materials Issues
3. Structural Integrity, Dynamic Behavior and Seismic Design
4. License Renewal, Life Extension, Decommissioning and Decontamination
5. Safety, Reliability and Plant Evaluations
6. Next Generation Systems
7. Thermal Hydraulics
8. Basic Nuclear Engineering Advances
9. Nuclear Fuel Cycle, Spent Fuel and Radwaste Management
10. Codes, Standard and Regulatory Issues

Authors should submit a 400-word

abstract with return address, phone, fax, and E-mail information by October 15, 1999 for consideration.

Online: <http://www.icone-conf.org/icone8/>. E-Mail: Submit-icone8@icone-conf.org

Mail: George Bockhold, US Program Technical Chair, c/o PO Box 116502, Gainesville, FL 32611-6502, USA; Telephone: 1+352-392-9722; FAX: 1+352-392-8656.

Plutonium Futures— The Science 2000

La Fonda Hotel
Santa Fe, New Mexico
July 10-13, 2000

The conference will cover scientific topics in plutonium and actinide sciences including actinides in the environment and the science underlying plutonium disposition.

Anticipated conference subtopics include:

- Separations
- Matrix interactions
- Materials compatibility
- Plutonium metallurgy
- Detection and analysis
- Environmental and biosphere chemistry
- Nuclear fuels
- Novel plutonium/actinide compounds and complexes

<http://www.lanl.gov/orgs/nmt/nmt-do/PuConf2000/PuConf2000.html>

For More Information Contact Andria Liesse, Conference Coordinator, by calling (505) 665-5981 or sending email to puconf2000@lanl.gov

Deadline for Summary: February 1, 2000.

MSTD Honors and Awards

The next MSTD Honors and Awards Banquet will take place at the ANS Winter Meeting in Long Beach, CA. The Banquet is scheduled for 11:30 a.m. Wednesday November 13th in the Seaview Rotunda at the Hyatt. Tickets are \$30. Please look for the MSTD Awards Banquet on the ANS Winter Meeting Registration Form and sign-up!

The Honors and Awards Banquet takes place every three years, so this is a chance to participate in honoring several of the outstanding contributors in the MSTD over the past three years. The banquet will honor the recent Mishima Award winners (granted by ANS) and a number of MSTD award winners. The MSTD Awards are listed below. A complete description of the awards and past winners can be found at the ANS-MSTD web site at http://www.pnl.gov/ans_mstd/awards.html.

◆ **Special Achievement Award:** Single, unique special achievement – need nominees (multiple, annual)

◆ **Outstanding Achievement Award:** Sustained outstanding achievement – need nominees (multiple, annual)

◆ **Literary Awards:** Best, full length paper or review article – need nominees (2 – 1 for each type, annual)

◆ **Award of Recognition (Significant Contributions):** Best paper at ANS meetings – need nominees (2 – 1 for each meeting, annual)

◆ **Past Chair Award:** Recognize contributions of past chair – straight forward

◆ **25 Year Service Awards:** MSTD members who have contributed to the field – need nominees (multiple, annual, straight forward with proper records)

◆ **Student Literary Award:** Best full-length paper submitted to Nuclear Technology or other ANS Journal from a ANS meeting presentation by a student (annual)

◆ **Graduate Scholarship Award:** Encourage academic excellence and significant contributions – need nominees (annual)

The MSTD Honors and Awards Committee is still soliciting nominations in all of the major categories. Since the Awards cover a three-year period, is appropriate to send nominations for activities in any of the past three years. Nominations can be sent by e-mail to Jim Stubbins (jstubbins@uiuc.edu) or to Dave Senor (david.senor@pnl.gov) or by mail to Jim Stubbins Please contact Jim Stubbins for further information. Nominations will be accepted through September 30th.

✻

Jim Stubbins

**Help us serve you and your MSTD colleagues better.
Please return this response form to Dave Senor by mail
or email a direct response to david.senor@pnl.gov.**

MSTD IS IS NOT my primary Technical Division of choice within ANS.

Send special MSTD-related announcements or alerts to me by email.

My email address is: _____

I'd like to help plan, organize and chair special sessions.

I'd like to serve on the Program Committee and develop themes/sessions for general and topical meetings.

I'd be glad to help review technical papers.

I'd like to assist with Honors and Awards.

I'd like to serve as an International Liaison.

I'd like to serve on the Planning and Membership Committee.

I'd like to serve on the Program Committee.

I'd like to serve on the Publicity Committee.

I'd like to assist with the Newsletter.

I'd like to serve as the Executive Committee and represent others in MSTD with similar technical interests.

Name: _____ Company: _____

Address: _____

Phone: _____ FAX: _____

Technical Program News

Report on MSTD Sessions at the Annual Meeting in Boston Last June

The MSTD Program Committee has been very active recently. At the 1999 ANS Annual Meeting in Boston last month, the MSTD sponsored three special sessions with a total of 16 papers presented.

Jim Stubbins organized a very well attended session on materials for accelerator-driven systems and spallation neutron sources. This topic fit well with a number of other sessions held at the meeting that were sponsored by the Accelerator Applications Working Group, and drew a significant number of attendees from accelerator-oriented fields.

Kenan Unlu organized two well rounded special sessions at the Boston meeting on nuclear methods in materials research. These sessions also were well attended by individuals outside the traditional nuclear materials community, including neutron scientists from Japan and Europe.

All three of these sessions demonstrate some early success in our attempts to broaden the appeal of MSTD programming beyond its traditional constituency of the advanced fuels community. All those involved in organizing and participating in these sessions are to be commended for their hard work.

MSTD Sessions at the Winter Meeting in Long Beach

The MSTD has planned five sessions for the 1999 ANS Winter Meeting in Long Beach this

November. These sessions focus mostly on fuels-related issues, and the topics include fuel thermochemistry, mixed oxide fuels, advanced fuels, Zr-base alloy properties and performance, and aging effects in nuclear materials science.

The final program for the Long Beach meeting will be organized at the paper review on 24-27 July. Full descriptions of each session are available at the MSTD web site, http://www.pnl.gov/ans_mstd/, and a list of the papers to be presented in Long Beach will be posted on the web site after the paper review is completed.

Planning is in the early stages for five MSTD sessions proposed for the 2000 ANS Annual Meeting in San Diego next June. The session topics include materials for accelerator-driven systems, materials compatibility in liquid metal coolants, radiation and environmental cracking of LWR core components, structural materials for gas-cooled reactors, and fuels for advanced gas-cooled reactors.

Session summaries and the session organizers are listed below. If you are interested in contributing a paper or helping to organize a session, please contact the individuals listed below or the MSTD Program Chair, Brent Lewis.

MSTD Sessions at the 2000 ANS Annual Meeting in San Diego

Materials for Accelerator-Driven Systems

Session Organizer: Jim Stubbins

Several programs in the United

States and around the world are developing accelerator-driven systems where neutrons produced by spallation are used for materials science, materials processing, spent fuel treatment, isotope production, medical diagnostics and therapy, neutron science, particle physics, and other applications. Target, blanket, and structural materials in these systems are exposed to severe environments.

Performance considerations include radiation damage from neutron and charged particle irradiation, corrosion from contact with a variety of fluids, and high temperature operation. The proposed session will explore radiation and other effects on materials in accelerator-driven systems. Selection criteria and severe life assessments for materials in these systems will be considered as well.

Materials Compatibility in Liquid Metal Coolants

Session Organizer: Todd Allen

The use of liquid metals as coolants in nuclear systems recently has attracted significant interest in the scientific community worldwide. These systems have been studied for a variety of applications, including power reactors, accelerator targets, and subcritical accelerator-driven spent fuel burners.

One of the primary issues in developing liquid metal cooled nuclear systems is compatibility of structural materials with these coolants. The proposed session will focus on the materials science of interactions between various

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liquid metal coolants with reactor structural materials. Issues such as oxide structures and corrosion rates as a function of alloy composition and oxygen partial pressure will be discussed.

Radiation and Environmental Cracking of LWR Core Components**Session Organizer: Todd Allen**

Intergranular cracking of PWR and BWR components continues to be an unresolved technical question, with serious implications for safety, high burnup fuel assemblies, and reactor lifetime extension. Radiation effects on microstructure and water chemistry may contribute both to the initiation and acceleration of intergranular cracking.

The proposed session will consist of discussions on microstructural development, deformation, crack growth, and water chemistry, and the relationship between these issues and intergranular cracking in LWR core components.

Structural Materials for Gas-Cooled Reactors**Session Organizer: Jim Stubbins**

The successful development of gas-cooled reactors depends heavily on materials performance. These reactors require materials that can withstand very high temperatures, typically 850°C and above, and high temperature corrosion in the gas coolant.

The main corrosion issues with metallic materials are due to the carburizing atmosphere resulting from small concentrations of impurity gases and pickup of carbon from the core. In addition, the strength and time-dependent

mechanical properties of many materials limits their extended use in this temperature range.

The development of new high temperature, corrosion-resistant intermetallic and ceramic materials may provide some new avenues for reliable, long-term operation. This session will examine the current status of developments in structural materials for high temperature gas-cooled reactors.

Fuels for Advanced Gas-Cooled Reactors**Session Organizer: Jim Stubbins**

The development of microsphere fuel forms provided the basis for the development of high temperature gas-cooled reactor technology. Several issues regarding fuel fabrication, fuel integrity, fuel structural performance, and fission product evolution have been addressed.

These fuel forms have been deployed successfully in both "pebble" geometries and in "prismatic" geometries. Nevertheless, fuel development and performance for a new generation of high temperature reactors is a significant issue for reactor safety and performance, as well as for power generating costs. This session will consider the current status of developments in fuel materials for high temperature gas-cooled reactors.

Topical Meetings

The next LWR Fuel Performance topical meeting is sponsored by the Fuel Cycle and Waste Management Division, and is scheduled for April 2000 in Park City, UT. Planning for the next MSTD-sponsored LWR Fuel

Performance topical has already started.

Based on the success and increasing international participation in recent meetings, the MSTD and FCWMD executive committees passed resolutions at the Washington meeting last November to increase the frequency of the LWR Fuel Performance topicals from once every three years to every other year, starting with the next MSTD-sponsored meeting. Therefore, plans are being made for a meeting in 2002.

Jim Tulenko has taken the lead for preliminary planning, and the MSTD expects to solicit bids from interested local sections this fall, with final presentations to be made at the executive committee meeting in Long Beach this November.

Electronic Paper Review

In other program news, the MSTD executive committee allocated funds at the Boston meeting last month to implement an electronic paper review system to eliminate the need for travel to the paper reviews held twice yearly before each ANS national meeting.

The e-review effort is headed by Brent Lewis, and the electronic system will be in place in time for the San Diego meeting paper review next February. Links to the electronic paper review system will be included on the MSTD web site after everything is in place. If you are interested in participating in future e-reviews, please contact Brent Lewis. ☼

Brent Lewis

MSTD Executive Committee Meeting Minutes ONLINE!

Materials Science and Technology Division
Executive Committee Meeting Minutes

Minutes are recorded for each Materials Science and Technology Division (MSTD) Executive Committee meeting. The minutes are prepared and distributed by the MSTD Secretary/Treasurer prior to the Executive Committee meetings at the ANS Annual and Winter Meetings. The MSTD Executive Committee meetings are typically held from 7 to 9 PM on Mondays during the ANS Meetings, and anyone is welcome to attend. For questions, comments, or to obtain hardcopies of the attachments to the minutes, please contact the current MSTD Secretary/Treasurer, [Jim Laidler](#).

Meeting Minutes

- [1999 ANS Annual Meeting - 7 June 1999](#)
- [1998 ANS Winter Meeting - 16 November 1998](#)
- [1998 ANS Annual Meeting - 8 June 1998](#)
- [1997 ANS Winter Meeting - 17 November 1997](#)
- [1997 ANS Annual Meeting - 2 June 1997](#)

Keep in touch via the MSTD website!

Materials Science and Technology Division
1999 ANS Annual Meeting - 7 June 1999

Attendees

- Todd Allen (ANL)
- Samim Anghaie (University of Florida)
- Jim Laidler (ANL)
- Sean McDeavitt (ANL)
- David Senor (PNNL)
- Jim Stubbins (University of Illinois)
- Jim Tulenko (University of Florida)
- Kenan Unlu (Cornell University)

The meeting was called to order at 7:00 pm by the outgoing Chair, Jim Tulenko.

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