MATERIALS SCIENCE & TECHNOLOGY

MSTD Newsletter January 1999

Message from the Chair

Dear Colleague…

…these are challenging times for the nuclear field.

Thanks to Bob Seidel—we have resurrected the newsletter for the Material Science and Technology Division.

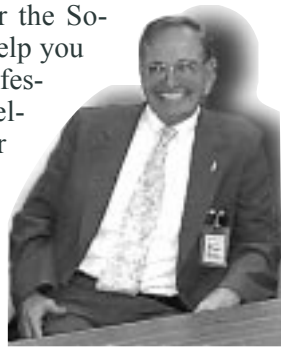
The Division had a great executive committee meeting in November in Washington. We had an excellent turnout, some great ideas and a lot of enthusiasm. Our membership is working hard to keep the Division a vibrant and ongoing organization. Yet, there are continuing concerns that like the Marines there are just a few good people who are able to make it to national meetings. We need everyone's help to keep the Division and the Society going. The Society's and the Division's membership is contracting. Some of our members are retiring and it seems like the younger members can't get to the meetings or are finding they must chose between societies. We must strive to offer technical meetings that our membership will want to attend for professional and technical development. Certainly, the Plutonium Futures Topical was a success and is being repeated with MSTD co-sponsorship. We are fortunate that Brent Lewis has agreed to take on the task of planning our technical programs. We should all strive to give him whatever help and assistance he needs.

For the Society as a whole these are challenging times. This November, the ANS was asked by the Washington D.C. hotel—where we have held our meetings for years—not to return on our regular rotation in two years because the ANS rents too few rooms to support all our meeting room requirements. The Society is searching to find a replacement hotel in Washington for 2001. The Society has a need to assure a continued exchange of technical information within the framework of the American Nuclear Society meetings where the emphasis is on nuclear fission, fusion, and the control and use of radiation. It is important that our Division maintains it's active role in sharing information, knowledge and experience.

I personally believe that our Division is one of the most important in it's contribution to the success of the nuclear enterprise. In my years in industry, I found that all my company's tough problems were material science ones.

This newsletter is only one of the ways we facilitate communications among our membership. We also maintain one of the finest web sites in the ANS, thanks to Dave Senor. We will be cosponsoring a topical meeting in Salt Lake City in the year 2000 on Light Water Reactor Fuel Performance. The division is looking to make this meeting a biennial event instead of every three years as it had been formerly. The MSTD is looking to sponsor the next Light Water Reactor Fuel Performance topical in 2002. I would really appropriate your views on your choice for a meeting site, either in the U.S., or in France, England, Japan, etc.

I welcome your feedback on any matter in which the Division or the Society can help you in your professional development, or you can help the Society and your fellow members. It is more important than ever that each of us do all we can to assure that the nuclear option will be fully understood by the public and that the ANS will be around to ensure that decisions are made with the correct facts and not with irrational opinions.



Ever smiling Jim…

I hope to see you in Boston in June. ❀ James S. Tulenko

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Notes from the Vice-Chair

At the recent ANS Winter Meeting in Washington, DC, I attended several national committee meetings at which issues of relevance to the MSTD membership were discussed. At the Professional Divisions Committee meeting, ANS President Ted Quinn discussed his desire to rapidly move ahead with the third round of ANS infrastructure changes.

The first two rounds dealt with the makeup of the Board of Directors, the structure of some standing committees, Local Section issues, and membership grade restructuring. The third round will address the structure of the professional divisions and the national meetings.

Hot topics of debate at the Professional Divisions Committee meeting as well as at the National Program Committee meeting included whether to have one or two national meetings per year, what the content of those meetings should be, and whether the current structure of the professional divisions was viable. Many individuals in the Society have passionate opinions on all these subjects, so the continuing debate on what infrastructure changes to make (if any) probably will be lively.

The first "Infrastructure III" meeting is scheduled for March 20-21, 1999 in Washington, DC. Representatives from all affected organizations have been invited to the meeting, including ANS Officers, Board of Directors members, ANS staff, National Program Committee members, Professional Divisions Committee members, and representatives from each of the professional divisions. We need to ensure that our interests are heard in this debate, so it is very important that we have a representative at this meeting. It is also important that our representative attend the meeting armed with input from the MSTD membership. If you are interested in representing the MSTD at this meeting or would like to provide some thoughts to our representative, please contact me by phone: (509) 376-5610, fax: (509) 376-5824 or email: david.senor@pnl.gov.

Another topic of discussion at the Professional Divisions Committee was the recently-adopted ANS Strategic Plan. This Plan, an outcome of earlier infrastructure changes, was approved by the Board of Directors at the ANS Annual Meeting in Nashville in June. Because the professional divisions represent the heart and soul of the Society, the ultimate success or failure of the Strategic Plan will be determined by the manner in which it is implemented by the divisions.

Two of the broad goals stated in the Plan are directly related to activities organized and executed by the professional divisions. One of these goals is to make ANS the recognized leader for the advancement of nuclear science and technology. The other is to make ANS the primary resource for professional development and knowledge exchange among its members. The MSTD currently is engaged in several activities that directly or indirectly support these goals, including working to increase MSTD technical programming at the ANS national meetings, exploring cooperative technical programming with nuclear materials groups from other societies, maintaining a MSTD web site, and publishing a MSTD newsletter.

Other relevant initiatives the Division currently is pursuing include moving to electronic paper reviews, exploring the possibility of journal publication for MSTD papers presented at ANS national meetings, and increasing the industrial and international representation on the MSTD Executive Committee.

A final note regarding the impact of recent infrastructure changes to the MSTD has to do with better communication between Society governance committees and the professional divisions. Each division has been asked by the Public Policy Committee to provide a contact to serve as a technical resource when the Society needs to issue a public statement on a topic of current interest (e.g. weapons Pu disposition). John Lambert, of Argonne National Laboratory, has agreed to serve in this role for the MSTD. He will be contacted by the Public Policy Committee whenever they need to draft a materials-related press release or position paper. John will likely be drawing on the entire MSTD membership to help him in this role, so don't be surprised if he gives you a call some day soon.

The Membership Committee has also issued a call to the professional divisions for liaison representatives. There are a number of important membership initiatives under way in the Society, including proposals to change the membership grades, prioritization of ANS members' professional division associations, and methods for increasing overall Society membership. It is important that the MSTD have a voice in these activities. If you have any interest in serving as the MSTD representative on the Membership Committee, please contact me before the June ANS Annual Meeting in

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Notes from Vice-Chair

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Notes from Vice-Chair

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Boston.

Lastly, on the final day of the Washington meeting, I had the opportunity to make a short presentation to the ANS Board of Directors on behalf of the MSTD. I reported to the Board that our membership numbers have been relatively stable at about 800 for the last two years, but that they were down from 1200 four years ago. This reflects the general membership trend in the Society at large. I also discussed our support of topical meetings and demonstrated that even though our membership numbers had declined, our budgets over the same period had remained relatively stable.

I used these statistics to point out that although our Division has struggled with support for the ANS national meetings in recent years (see the Technical Program Committee report in this newsletter), our support of topical meetings has kept us relatively healthy. I described in some detail our attempts to expand the technical scope of our Division and our efforts to increase MSTD programming at the national meetings. Finally, I reviewed for the Board our other ongoing efforts including student support, Schumar scholarship sponsorship, and honors and awards activities. The presentation was well received by the ANS Officers and Board of Directors, and ANS President Ted Quinn thanked the Division for its efforts.

It's been a busy few months since I was elected Vice-Chair of the Division, but I've enjoyed the work so far. I look forward to serving as Chair of the MSTD as we move forward with our efforts to revitalize the Division and the Society. However, we need your help to be successful. If you have any interest in becoming more active within the Division, please contact me. There are many ways for you to contribute and any participation at all will be appreciated. ❀

David Senor
MSTD Vice-Chair

Engineered chocolates

for Valentines Day?

Check it out:

www.eweek.org/1999/news/Features/chocolat.html

Special Sessions…

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for the Boston, MA meeting in June 1999. In addition to extended abstracts that will be published in Transaction of the American Nuclear Society, the MSTD is also exploring the possibility of publishing the full text of submitted papers in the peer-reviewed journal Nuclear Technology.

Accelerator-Driven Systems

Several programs in the United States and around the world are developing accelerator-driven systems where neutrons produced by spallation are used for isotope production, waste processing, neutron science, materials science, spent fuel conversion, 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 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.

Contact Jim Stubbins or
David Senor

Fast Reactor Standby and Restart

Several fast reactors around the world are currently in a state of hot standby. These include the Fast Flux Test Facility in the United States, Monju in Japan, and SuperPhénix in France. The near-term fate of each of these reactors is somewhat uncertain, and each is currently being maintained in a state of readiness while their respective governments debate their future.

There are a host of materials science and technology issues associated with maintaining a liquid-metal-cooled reactor in a state of hot standby. Additional materials issues present themselves in the event a reactor is restarted. Papers will be solicited for this session that address fuel and structural materials issues related to maintaining or restarting fast reactors. Materials issues associated with potential decommissioning of such reactors will not be covered in this session.

Contact David Senor

Isotope Production, Processing, and Applications

There is a growing need for both stable and radioactive isotopes for a variety of industrial and medical uses. Isotopes are needed in industry for food irradiation, product sterilization and radioactive tagging. Medical uses for isotopes in-

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Technical Program Committee News

Over a year ago, a decision was made by the MSTD Executive Committee to broaden the scope of the Division's technical programming to better support the ANS Annual and Winter meetings. Traditionally, MSTD support at the ANS national meetings was derived from the US nuclear fuels research and development community. Funding for US fuels research has been dwindling for several years, and MSTD programming at the ANS national meetings has decreased accordingly.

In an attempt to appeal to a wider audience and rejuvenate MSTD programming, the Division's Technical Program Committee was charged with developing fuels-related technical sessions at the ANS Winter Meetings, and non-fuels-related technical sessions at the ANS Annual Meetings. The results of this approach began to be realized at the recent ANS Winter Meeting in Washington, DC. Two sessions were sponsored by the MSTD on topics including transient fuel behavior and mixed oxide fuel performance.

Technical sessions featuring five non-fuels topics are planned for the 1999 ANS Annual Meeting in Boston. The session topics focus on materials issues in a variety of nuclear technology applications, including accelerator-driven systems, fast reactor standby and restart, isotope production, processing and applications, fusion energy devices, and nuclear methods in materials research. This series of special sessions is designed to highlight the importance of materials to nuclear technology in a variety of emerging areas. If you are interested in contributing a paper to one of the planned sessions, please contact David Senor, (509) 376-5610, or Brent Lewis, (613) 541-6000 x6611, for more information. Alternatively, you may consult the MSTD web site at http://www.pnl.gov/ans_mstd/programming.html. The web site includes summaries of the desired technical content as well as email links to the session organizers. If you intend to contribute a paper, please submit your extended abstract to ANS or the session organizers no later than the Boston Meeting paper review scheduled to begin on 7 February 1999.

Planning is in the early stages for four special sessions to be held at the 1999 ANS Winter Meeting in Long Beach, CA. The sessions will focus on fuels-related issues of current interest including mixed oxide fuels, fuel thermochemistry, advanced fuels, and Zr-base alloy properties and performance. For more information, check the MSTD web site or contact Brent Lewis or David Senor.

Brent Lewis was recently appointed Chair of the MSTD Technical Program Committee. Brent is a Professor in the Department of Chemistry and Chemical Engineering at the Royal Military College of Canada, and he is actively involved in the field of fuel thermochemistry and fuel performance modeling. Brent replaces Steve Hayes, of Argonne National Laboratory-West, who served as the MSTD Technical Program Chair for the past three years. Steve is responsible for many of the Division's recent efforts to revitalize its technical program at the ANS national meetings, and his contributions will be missed. If anyone is interested in serving on the Technical Program Committee, please contact Brent Lewis for more information.

Other technical programming items of interest include approval of a resolution by the MSTD Executive Committee at the recent Washington meeting to increase the frequency of the Light Water Reactor Fuel Performance Topical Meeting from once every three years to once every two years after the next meeting scheduled for May 2000 in Park City, UT. The MSTD alternates with the Fuel Cycle and Waste Management Division for sponsorship of this meeting. The recent success of the meeting, particularly with regard to international participation, indicated the need for the increase in frequency.

At the Washington meeting, the Executive Committee also approved MSTD Class IV sponsorship of two topical meetings: the Ninth International Conference on Fusion Reactor Materials, to be held in October 1999, in Colorado Springs, and Plutonium Futures—The Science, to be held in July 2000 in Santa Fe, NM. ❀

Check out the National Engineers Week website and discover how Radioactive Glass Microspheres are proving to be an effective way of safely delivering large doses of radiation to cancerous tumors.

www.eweek.org/1999/news/Features/microspheres.html

Notes from the Past Chair

Over the past couple of years, the Materials Science and Technology Division Executive Committee has become concerned that MSTD is not serving its members as well as it has in the past. This was evidenced by the small, and declining, number of ANS members that select MSTD as their technical division within the ANS and particularly by the Division's diminishing technical program: few MSTD special sessions for ANS meetings were being proposed, paper submissions to MSTD special sessions were diminishing, and recent MSTD sessions had been poorly attended. (The primary reason that MSTD finds itself in this position is the cessation of R&D efforts in what had become the Division's major topics: performance of advanced reactor fuels and materials.)

In addition to a diminishing technical program, the Executive Committee was suffering from a dearth of individuals with time available for addressing MSTD concerns. Although these problems were somewhat endemic to the ANS as a whole, we felt that the MSTD needed rejuvenation in order to provide a better professional forum for its membership and to make its proper contribution to the health of the Society.

At the November 1996 executive committee meeting we put forth the following premise: that the MSTD would either be revitalized or it would cease to exist within the ANS; maintaining the status quo was not acceptable, particularly during a time when the Society itself was making changes to address concerns brought on by declining membership. After discussion of our situation, the Executive Committee decided that the MSTD can still be viable and that the professional disciplines embodied within the MSTD should retain a separate division in the Society. We concluded that the appropriate way for MSTD to be revitalized was through re-establishment of a healthy and vibrant technical program. With that in mind we proposed a set of goals and criteria against which to evaluate our efforts:

Bill Scott presents Doug Crawford with an award of special recognition for Doug's leadership and technical contributions to the DOE's Plutonium Focus Area.

1. MSTD should seek to establish an additional topical meeting (either stand-alone or embedded into larger ANS meetings) on a regular, periodic basis;

2. MSTD should sponsor 3 to 4 special sessions at one national meeting (at least) per year (historically, this has been the winter meeting for MSTD);

3. MSTD sessions should average about 6 papers and 20 to 25 attendees each;

4. MSTD vitality should be reflected through either an increase in the number of ANS members that select MSTD as their technical division, or a recognizable increase in ANS members that are willing to contribute to MSTD technical program or governance activities.

How are we doing so far? Well, paper submittals for MSTD sessions at the ANS Winter Meeting held in Albuquerque were up somewhat, with 10 papers being presented in two sessions. One of those sessions was entitled "Survey of Materials Applications in Nuclear Technology" and was proposed as a trial to determine the level of interest in materials-related aspects of the technologies being addressed by ANS members.

The range of topics of the papers submitted confirmed our suspicion that materials issues are still relevant to nuclear professionals. Twelve papers were presented at two special sessions at the recent meeting in Washington, D.C. Attendance at those meetings averaged 15, but was as high as 20 on occasion.

The MSTD Technical Program Committee is considering how to best promote a series of special sessions on nuclear materials ap-

plications; if the series proves successful, then MSTD might consider expanding it to become a periodic, embedded topical meeting. Another technical program initiative being developed is a set of special sessions on fuel technology to be held annually.

One lesson has been learned particularly well over the past couple of years: if a technical session or topical meeting is to be successful, then the organizers must be willing to accept responsibility for promoting the meeting and soliciting participation. We can identify instances of MSTD meetings or sessions that were successful because of the efforts of the organizers, and others that languished because no one was able to actively organize the technical program. People who propose sessions always mean well, and most of the sessions that have been proposed recently but failed were good ideas, but active participation is essential. Therefore, I encourage any of you who are interested in becoming more active in the ANS or in MSTD to consider working on the MSTD Program Committee. Working to develop a successful technical program for MSTD would be a valued and appreciated contribution to the Society.

Because this is our first newsletter in quite a while, I would like to express appreciation to Mitch Cunningham, a Past Chair of MSTD, and to Rick Mason, a past chair of the MSTD Honors and Awards Committee. Mitch was a very effective Chair, and very diligently and promptly attended to Society business on behalf of the Division. Rick Mason not only put together the awards given out in 1996, but also took extra measures to address some errors the engravers made in the plaques. Also, thanks to Jim Stubbins of the University of Illinois, who agreed to serve as the current MSTD Honors and Awards Committee Chair and to Bob Seidel for continuing to edit and publish the MSTD newsletter. Efforts by a few individuals to develop the MSTD technical program are notable. Dave Senor (the current Vice Chair/Chair-Elect), in particular, has worked hard to develop and promote the special sessions at the past several national meetings. Steve Hayes and Brent Lewis (the past and present Program Committee Chairs, respectively) have also made important contributions. And clearly, the professionals that put forth the time to submit and present papers at MSTD sessions make contributions that are essential to the health of a professional society. ❀

Doug Crawford
Past Chair

Special Sessions…

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clude both diagnostic and therapeutic applications. Isotopes can be produced in reactors or accelerators, and research on both is currently in progress. This session will focus on materials aspects of isotope production, processing and applications including, but not limited to those identified above.

Topics of interest include selection of target materials, processing of irradiated materials, and encapsulation/stabilization of the desired products. Papers are solicited that focus on these and other materials science and engineering issues, rather than policy, safety, or radiological health aspects of isotope technology.

Contact David Senor

Fusion Energy Devices

Research on fusion energy devices continues for a wide variety of applications. In addition to development of large-scale fusion reactor systems such as the International Thermonuclear Experimental Reactor, there is also a growing area of study on compact fusion energy devices for other applications utilizing high energy neutrons. These applications include materials science, non-destructive characterization, and remote sensing.

Another growing area is science-based stockpile stewardship using the inertial fusion system being developed at the National Ignition Facility. Materials issues are as central to inertial fusion applications as they are to magnetic fusion systems. Papers are solicited for this session that deal with science and engineering aspects of materials for all types of fusion systems.

Contact David Senor

Nuclear Methods in Materials Research

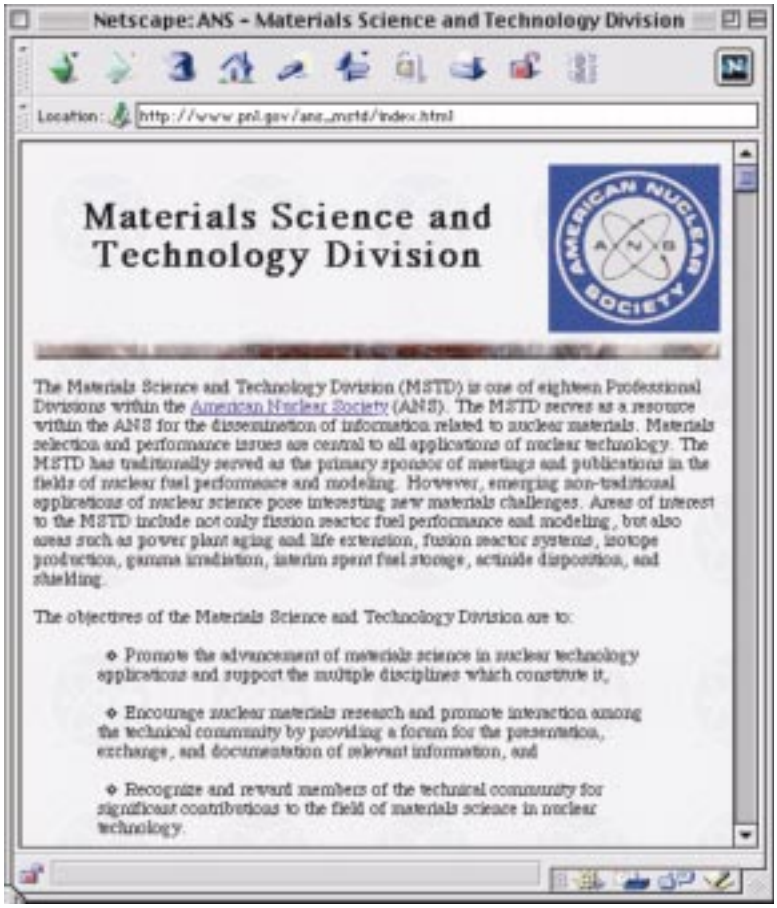
Nuclear methods are widely used in materials research, particularly for materials characterization. Some nuclear techniques are used as a probe to determine the structure while others are used for chemical analysis. Neutron scattering, neutron diffraction, neutron reflectometry and x-ray methods are some of the examples used in materials structure characterization.

Neutron depth profiling, neutron activation analysis and prompt gamma activation analysis are examples of the chemical analysis techniques that require measurements of nuclear radiation produced by neutron capture. Diverse applications of these nuclear methods in materials research will be included in this session. ❀

Contact Kenan Unlu or
David Senor

MSTD Webpage is ACTIVE!

The Materials Science and Technology Division was one of the first professional divisions within the American Nuclear Society to have its own web site. The MSTD site is located at http://www.pnl.gov/ans_mstd/.



Besides general information on the mission of the MSTD and email links to the officers, executive committee members and standing committee chairs, the site provides a significant amount of other content. You will find information regarding recent and planned MSTD technical programming, including lists of papers presented at recent ANS Annual and Winter meetings, summaries of proposed special sessions at upcoming ANS meetings, and links to MSTD-sponsored topical meetings.

You will also find a complete record of all honors and awards presented by the Division since its inception in 1963, the text of the MSTD Executive Committee meeting minutes for the past several years, electronic versions of recent newsletters, and information about the MSTD-sponsored Schumar Scholarship.

New additions to the site during the next few months will include an electronic version of the MSTD by-laws and a collection of links to relevant materials-related sites on the World Wide Web. If you are interested in contributing to the MSTD web site or have a suggestion for its improvement, please contact David Senor at 509-376-5610 or david.senor@pnl.gov. ❀

Special Sessions Focused on Materials for Nuclear Technology Applications

1999 ANS Annual Meeting
Boston, MA June 6-10,1999

Materials selection and performance issues are central to all applications of nuclear technology. Emerging non-traditional applications of nuclear science pose particular materials challenges. Accelerator systems are currently under development for a variety of applications including tritium production, neutron sources, and waste transmutation.

Food irradiation and product sterilization are becoming more common and appear to be approaching large-scale commercialization. There is an increasing need for stable and radioactive isotopes to meet a variety of industrial and medical demands.

Fusion energy devices continue to be studied for power production, neutron sources, and weapons stockpile stewardship. The Fast Flux Test Facility and other fast reactors around the world are in a state of hot standby and are under consideration for restart. Finally, nuclear methods are being applied to a variety of research areas including microstructural and chemical analysis.

The Materials Science and Technology Division has planned a series of special sessions at the 1999 ANS Annual Meeting to address some of the current issues associated with nuclear materials in non-fuel applications.

The papers will focus on materials science and technology rather than on programmatic or policy issues. Five special sessions are planned

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see **Special Sessions…**