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Expanding Scientific Communication
— Messages from STAM



TOPICAL REVIEW

Physics and chemistry of layered chalcogenide superconductors

Keita Deguchi^{1,2}, Yoshihiko Takano^{1,2} and Yoshikazu Mizuguchi^{1,3}

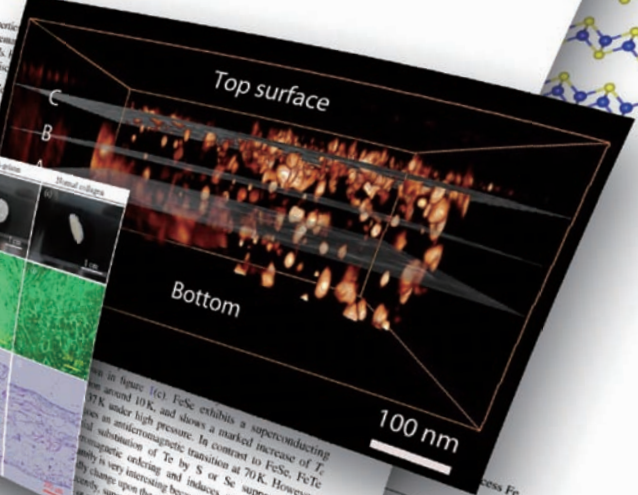
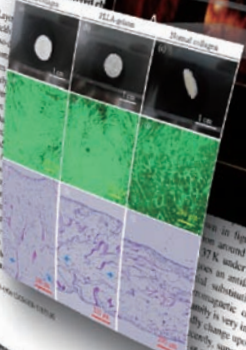
¹National Institute for Materials Science, 1-1-1 Higashi, Tsukuba, Ibaraki 305-8567, Japan
²Graduate School of Pure and Applied Sciences, University of Tsukuba, 1-1-1 Tennoyda, Tsukuba, Ibaraki 305-8571, Japan
³Department of Electrical and Electronic Engineering, Tokyo Metropolitan University, 1-1 Minamiohno, Hachioji, Tokyo 192-0297, Japan
E-mail: mizug@tmu.ac.jp

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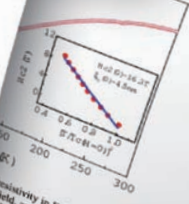
Abstract
Structure and physical properties of layered chalcogenide superconductors, especially Fe-based layered superconductors and their related materials, are reviewed.

Keywords: Fe chalcogenide, FeSe, superconductor

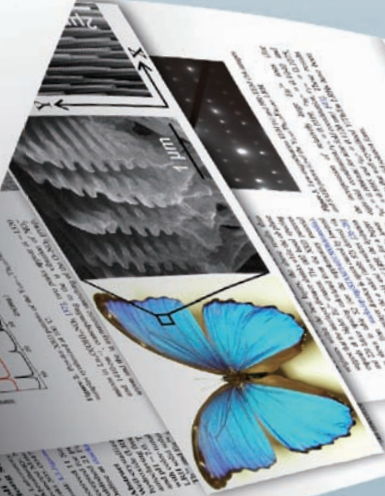
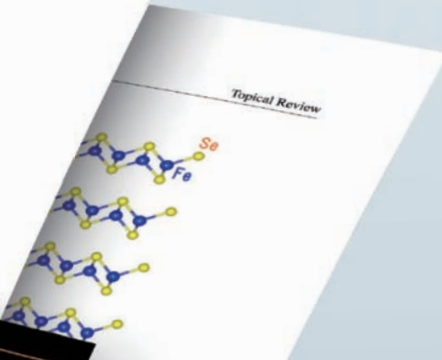
1. Introduction to layered chalcogenide superconductors



FeSe exhibits a superconducting transition around 10 K, and shows a marked increase of T_c under high pressure. In contrast to FeSe, FeTe shows an antiferromagnetic transition at 70 K. However, substitution of Te by S or Se suppresses the magnetic ordering and induces superconductivity. It is very interesting and induces superconductivity, especially upon the constant substitutions of S, Se and Te, superconductivity above 40 K was observed in the isostructural FeSe. To that respect, studies on the layered chalcogenide superconductors are of fundamental physics but also applications of



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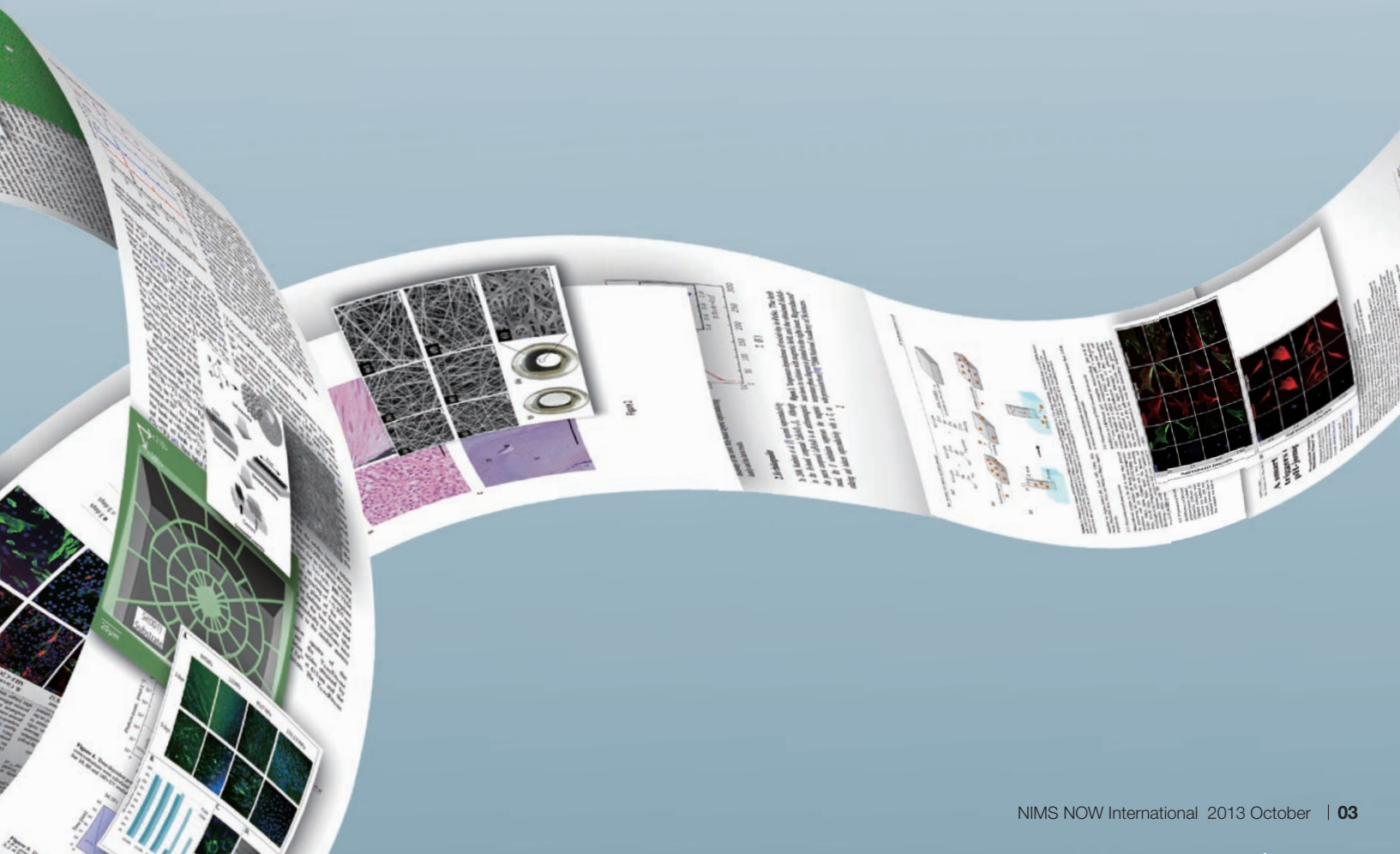


of reactivity in FeSe. The left inset shows the field-temperature phase diagram of FeSe. The right inset shows the field-temperature phase diagram of FeSe. The left inset shows the field-temperature phase diagram of FeSe. The right inset shows the field-temperature phase diagram of FeSe.

Expanding Scientific Communication — Messages from STAM

About 2.4 million scientific articles are published every year, and this number keeps growing. Amid the fierce competition toward a higher impact factor, which now even affects national policy, the situation surrounding science and article publication is changing at an ever-increasing pace. Scientists, readers and publishers are being asked about the reasons for writing an article and selecting a journal for publication.

Science and Technology of Advanced Materials (STAM), a materials science open-access journal supported by NIMS, is in the middle of this trend. How can science reach people? How should STAM select articles for publication? We aim to communicate our answers to these questions through our editing and publishing activities.



Special Discussion:

Future of academic journals and STAM

Science and Technology of Advanced Materials (STAM) is increasing its presence as a materials science journal not only in Japan, but also abroad. How is STAM received at materials science research sites? What kind of journal does STAM aim to become in the future? These and other topics are discussed below by Masakazu Aono, Director-General of the International Center for Materials Nanoarchitectonics (MANA), Toyonobu Yoshida, Editor-in-Chief of STAM, and Mikiko Tanifuji, publisher of STAM and Head of the Scientific Information Office at NIMS.

**Importance of having a Japanese materials science journal**

NIMS NOW: First, I would like to ask Dr. Aono. From your experiences at research sites around the world, what kind of journal do you find STAM to be?

Aono: After World War II, Prof. Hideki Yukawa launched an English-language journal, *Progress of Theoretical Physics*, in order to bring Japan's

important new research on elementary particles into the spotlight. Readers around the world were astonished to learn that excellent research was blooming in war-shattered Japan. However, such times soon passed, and by the time I became a researcher, there were many international journals to which I could submit articles to have my research exposed to the world, and I did not feel any inconvenience. After a number of years, a surprising change occurred with the advancement of the Internet. Thomson Reuters began to count and publish

the citation number (CN) of each of the enormous number of articles published in the thousands of journals around the world. Thomson Reuters also developed an index called the "impact factor" (IF) to show which journals have published articles with larger CNs, and created a ranking of journals as a result. I find this ranking to be fair in a sense, but it has two risks. One is that a journal with a high IF tends to attract higher quality submissions and eventually comes to dominate its field of publishing. The other is that young researchers new to this

Masakazu Aono × Toyonobu Yoshida × Mikiko Tanifuji

world mistakenly believe that articles published in high-IF journals are of higher quality. To come to the point as to your question about how I see STAM, while recognizing that IF has its pros and cons, I think efforts to raise IF would be imperative for achieving continuous development of STAM. It is a fact that high-quality articles are rarely submitted to low-IF journals. In that sense, I offer my heartiest congratulations and respect to the editorial staff of STAM for their efforts which has raised its IF to 3.75. The real challenge lies ahead. There is a need to send out a clearer message on the position of STAM, or, why STAM is a must. Let me discuss that later....

Yoshida: Competition among journals is intensifying, and IF has come to affect even national policy. Considering the future of the research fields and the national interest, the presence of a journal with guaranteed fairness and a hub function will be a strong advantage for the country. If Japan develops a leading materials science journal, that would be a benefit for the country. STAM is characterized by the awareness of “the true value of materials is in their use” which it shares with NIMS. When we review articles, we sometimes ask the authors to write a little more about possible applications. Since there are many other journals that handle articles on physics or chemistry alone, we focus on something extra when editing materials science articles. Then, authors start submitting such articles. Even if we reject an article, pointing out that it does not suggest any applications, the author sometimes resubmits the article after adding the requested section.

Aono: If we ask researchers around the world about the research fields in which Japan excels, they always mention materials, in addition to physics and chemistry. Nanotechnology is also a strong field related to these. For such fields in which Japan has an edge, Japan should firmly establish leading English-language journals. Some people say that we can simply use the many international journals that already exist, and I thought so too until ten years ago. However, the traditional function of journals as a place for researchers to help each other advance through fair competition is collapsing today. Dr. Yoshida referred to it earlier as “guaranteed fairness.” STAM aims to be a fair and world-class Japanese journal. In the meantime, while materials science is inseparable from basic

science such as condensed matter physics and molecular chemistry, as Dr. Yoshida said, the issue of practical application is extremely important. One of the future directions of STAM would be to clarify its approach to bridging basic and applied materials research. Conventionally, many Japanese journals in English had been published by academic societies, mainly for the purpose of supporting the members’ activities. However, we cannot create a truly international journal by merely pursuing such local objectives. I think STAM can increase its relevance by clarifying its global objectives as a distinctive Japanese journal in English published by an organization other than an academic society.

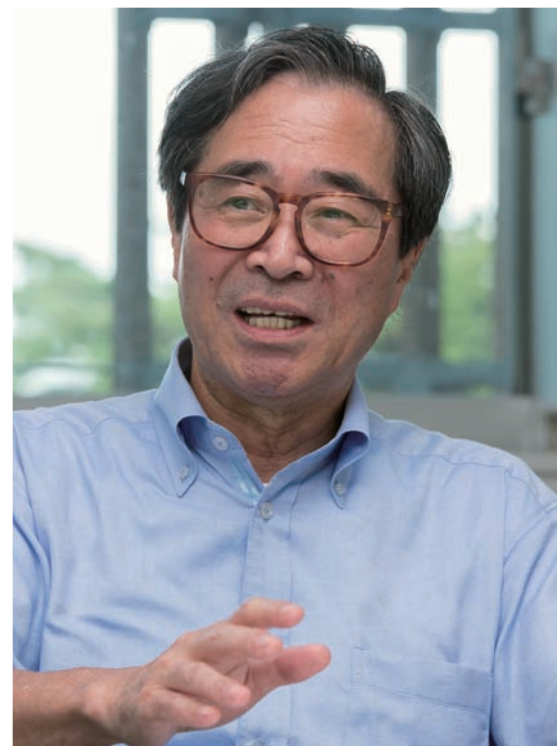
Yoshida: If there was an academic society in Japan which encompassed all materials-related fields, that society could have created a new journal. However, academic societies, which all have histories, cannot undergo organizational changes easily. We also had an idea to create a virtual group from the top layers of academic societies and have that group publish a materials science journal. This idea, however, gained little support, and was difficult to put into practice.

NIMS NOW: I see. So, the process of actualizing STAM was very difficult. I believe Ms. Tanifuji has gone through much trouble as a publishing director.

Difficulty of publishing a journal

Tanifuji: To be honest, I did not know the journal STAM when I first received an offer of a position at NIMS. I had been working as a publisher for 17 years at that time, and had known many academic journals in science. I thought about a number of aspects before making a decision as to whether or not to take the offer: the status of the journal and its future potential; how seriously NIMS planned to raise the value of the journal; what were the journal’s objectives; and how those objectives could be achieved. First, I thought STAM should pursue two goals: find an edge based on what academic societies cannot do; and do what academic societies can do, while taking advantage of being a research institute. During the first few years, I focused on making STAM known at NIMS. NIMS is a leading research institute, and the first point was to have

STAM spread through word of mouth in everyday conversation. At the same time, I worked to supplement what was missing in it as a journal, and to extract and strengthen factors that characterize the journal. For example, displaying the NIMS logo on STAM’s cover page shows that a leading research institute guarantees the quality of the content. I publicized the message that NIMS is serious about STAM through all kinds of channels to make it visible. I explained it not only to researchers, but also to academic societies and libraries in and outside Japan. I wrote reports and articles about it in various media and gave lectures at research meetings, academic conferences, libraries, and publishers’ gatherings when I had the chance. I think another role of NIMS as a national research institute is to communicate with academic societies in Japan and to share the spirit of improving each other’s journals.



Masakazu Aono

Doctor of Engineering. Completed the doctoral course at the School of Engineering, the University of Tokyo in 1972. He served as researcher at the National Institute for Research in Inorganic Materials (NIRIM), senior researcher at NIRIM, chief scientist at the Institute for Physical and Chemical Research (RIKEN), professor at the Graduate School of Engineering, Osaka University, and Director-General of the Nanomaterials Laboratory, NIMS. In April 2004 he became NIMS Fellow, and since 2007 the Director-General of MANA, NIMS.

Masakazu Aono × Toyonobu Yoshida × Mikiko Tanifuji

Aono: I have been watching Ms. Tanifuji tread a thorny path (laughing) from the sidelines. We can say in general that when a new journal grows into a leading journal in a short period of time, there is always a dedicated key person. It must have been difficult for Ms. Tanifuji to decide where STAM should be positioned. In my opinion, I think we must, as a premise, have a firm resolve to create a prestigious Japanese international journal in the materials research field in which Japan has an edge. To achieve that purpose, we cannot escape from the must-do of increasing the IF. One of my cherished mottos is to “better clarify your own position if competition intensifies.” In the field of materials research, there are already many good international journals (Advanced Materials, Advanced Functional Materials, Nature Materials, and so on). It is necessary to show how STAM differs from them, or, to clarify STAM’s position. In my view, I think that STAM

should clarify its stance to actively bridge basic and applied materials research, as I mentioned earlier, and, at the same time, I believe that STAM can also have the function of guiding research on fusion between materials and other fields. The most important among such other fields is biotechnology. Fusion between the two will be catalyzed by nanotechnology, so it would be wonderful if STAM could provide an arena for presenting new “materials-nanotechnology-biotechnology” fusion research.

Attracting good articles

Yoshida: In fact, Dr. Aono was a doctor at the same laboratory when I was a fourth-year undergraduate student. At the time, the annual volume of JAP (Journal of Applied Physics) was about 5,000 pages, and it contained articles of very high quality. Its annual volume today exceeds 20,000 pages. We need a whole bookshelf to keep a one-year stock of the journal. Since there is an enormous amount of information today, you are in the habit of trying to find good articles in journals which are more frequently cited than others. However, frequently cited information is not necessarily the information we truly need. Citation does not tell which journals are good for understanding not only the subject of research, but the trend of the entire field encompassing the subject. In that sense, it is important for journals to attract good articles and good reviews. A materials science journal that provides good reviews on the materials field or provides articles that give future outlooks can become a journal with a brand. Then, the journal can gain a strong foothold.

Aono: Good review articles are very effective for presenting information in a concentrated manner. When I myself am carrying out research and feel that I have entered a new domain, I search for review articles on that domain and read through them quickly to learn about the domain. If I read them thoroughly, my research can end up being less original, so I always only skim through them (laughing); I browse through the article, quickly looking at chapter titles and drawings, to gain a feeling of understanding. Anyway, journals that publish or are capable of publishing good review articles are fine journals.

Yoshida: For such purpose, too, we would like to keep on releasing about six topical focus is-

sues every year, as we do now.

Tanifuji: Today, the annual number of articles published around the world exceeds 2.4 million. Since there is a limit to the volume of information that can be processed by the human brain, the time we can spend reading an article is naturally limited, so we want to be selective about what we read. No matter how smart and fast the Internet becomes, it will not select and deliver to you only the important articles to meet your interests. Review articles can include those that give an overview of specific research over a long span, short explanatory reviews, and proposal reviews that give a broad future outlook. It is very important that reviews appear in due time. It is quality, rather than volume; the editor’s skill and vision in picking up on the research trends that shapes the journal’s character. I also think the philosophy of NIMS as a research institute explains the passion it has for STAM. Since NIMS has many institutional networks and researcher networks in and outside Japan, it is capable of selecting good referees and gaining good understanding of the research trends. In addition, it has a broad range of research and literature databases as a specialized institute. I think NIMS is in a great position to support the publication of review papers which cover various time spans and offer different points of view.

Yoshida: The IF value is also extremely effective when we ask authors to write reviews. It is only natural that writers want their articles to be read and try to write better articles for a larger audience.

Aono: The IF tends to be higher for journals with sharp objectives, setting aside the long-established Nature and Science. In that sense, there must have been a lot of effort to reach the current IF level for a Japanese journal that deals with a broad domain of materials. The journal title, Science and Technology of Advanced Materials, is also a very general one (laughing). Still, the IF reached 3.75. That is wonderful. We would want to push the IF up even further by adding new characteristics as we discussed earlier.

Yoshida: As I mentioned earlier, awareness that “the true value of materials is in their use” already runs through STAM. In addition to this, we must continue to anticipate the future needs of readers and authors. This is only possible with continuous support for the people who can engage in edit-

**Toyonobu Yoshida**

Doctor of Engineering. Completed the doctoral course at the School of Engineering, the University of Tokyo in 1977. After serving as research assistant, lecturer and associate professor at the Faculty of Engineering, the University of Tokyo, promoted to full professor at the Faculty of Engineering, the University of Tokyo, in 1989. He is a member of the Science Council of Japan, and NIMS Fellow since January 2012. Appointed as Editor-in-Chief of STAM in January 2013.

ing for a long term with devotion. For instance, STAM is now an open access journal (free to read), and I think it started to become well known after it changed to the open access model.

Tanifuji: The plan to shift to an open access model (from the conventional subscription model) was rejected by the editorial board at first in 2006. In order to make articles free to read, it is indispensable to minimize expenses, pursue economic efficiency of the journal by considering which parts should be cut and streamlined and, in return, which parts should be reinforced, and to create a stable publishing base. The first step is to go paperless. Yet, an online-only journal would lose a tangible form, which is why the open access model was initially rejected. It took me more than a year to reach a consensus at the editorial board and to decide changing to open access model, while seeking opinions of experts at times. If it were a journal of an academic society, the journal would have a solid objective of benefiting the society members, so if members want a printed version, it must be published, and a compromise plan would be adopted, reflecting the various opinions of the members. As a result, different conditions pile up, hindering progressive steps. Also, the use of an objective improvement method, such as seeking opinions of external experts, was relatively unpopular in Japan as compared to Europe and the United States. Even so, I think we were able to move forward at a good pace because the management team had a clear intention to make STAM a distinguished world-class journal.

Future of STAM and academic journals

NIMS NOW: Lastly, please tell us your ideas of the future from your respective standpoints?

Tanifuji: I think the practice of writing scientific articles will not change. Because of national policies, large amounts of money have been invested in various research fields, and this has generated very large volumes of articles. This, in turn has caused both authors and referees to become excessively busy. However, we must keep in mind that the true value of scientific publishing is to make a contribution to the development of science. If things continue as they are, what will journals be like in twenty or thirty years? Will they end their role as tools for the communication of sci-

ence? Just as scientists have a vision for the future of science, I also have a vision for the future of academic publishing. I don't mean publishing a high-tech journal in the technical sense. Rather, I am thinking everyday about what would be required from the science communication aspect. Yet, I believe nothing can be changed from the publishing side only. Fifteen years ago, STAM was inaugurated "to make substantial contribution to the development of the materials science field by clearly indicating the major trends of the field." It is important to bring this goal to readers and writers. I think that can be considered as one form of science; communication from those making a journal to researchers in the materials science field. Because the role of journals has become more complex, a publisher's responsibility is no longer to simply publish a journal; it must also act for the benefit of science.

Yoshida: At least we want people to recognize STAM as a major materials science journal published in Japan. We have yet to gain such level of recognition worldwide, but I think IF "3" is a threshold level. The next threshold would be "5." So, in the short term, we will think about how we can achieve "5." A long-term concept would be how we should consider materials within science. Japan has been considered to have an edge in materials for decades, but originally, Japan had an edge in iron and steel. That is not the case today. If we could show the areas in which Japan really has an edge at present, we would be more than happy as journal editors.

Aono: When I write an article, I have two objectives. One is to write an article that lasts long in history. That is, to make a mark in history. The other is to tell as many people as possible about my great finding as soon as possible. That is, advertising activity. If I only had the former objective, I would submit my article to any journal, just as Dr. Yukawa's first article on mesons was published in Japanese. However, to achieve the latter objective, it is undoubtedly more effective to submit the article to a high-IF journal. I hope STAM will grow into a journal which young researchers would want to select as a place for presentation when they achieve wonderful research results after hard work.

Yoshida: A significant advertising effect is also important as a benefit for the contributor or as a motive for contribution. And, of course, how can we make STAM a journal that readers want to

read? Although IF has its pros and cons, we inevitably have to attach weight to it at present. We want to raise IF, attract good articles, and also, as a whole, increase the brand value.

Aono: Richard P. Feynman wrote a famous article in 1959 titled "There's Plenty of Room at the Bottom" (there is room for great development even in the microscopic world). This article, which predicts the development of nanotechnology, is read by many people and is one of my favorite articles, but its citation number is not very large. Since it is more like an essay rather than an academic article, I have never cited that article when writing my own articles. I hope STAM will be a journal that can publish such articles, too.

Tanifuji: In the future, we would very much like to publish such articles which may not be cited frequently but are truly interesting. In fact, that is what an academic journal should be like.



Mikiko Tanifuji

Master of International Studies. After serving as Associate Executive Director of the then Institute of Pure and Applied Physics, in 2005 she joined NIMS. Throughout 17 years of experience as an editor and publisher of academic association journals in physics, applied physics, and optics, she engaged in article editing, electronic publishing, XML databases, secondary services of bibliographic information, and development of the initial version of J-Stage, in line with the diffusion of the Internet. She is a member of the Japan Society of Applied Physics and the Society for Scholarly Publishing. As a special appointed member of the Science Council of Japan she is part of a subcommittee on scientific journals in Japan.

Aiming to Become a Comprehensive Academic Journal in Materials Science

Editor-in-Chief
Science and Technology of Advanced Materials (STAM)

Toyonobu Yoshida

Significance of an Academic Journal

For researchers, organizing their research results into articles and presenting these articles to the public is the final and critically important phase in the cycle of their research activities. The primary *raison d'être* of academic journals can be described as providing researchers with forums for such presentation. However, for us academic journal editors, the imperative mission is to aim for the advancement and development of science through collaboration with researchers, by publishing their research results in accordance with the status of the journal as well as its editorial policy and principles.

In general, academic journals are divided into those issued by academic societies and those issued by commercial publishers. Academic societies publish journals with the objective of maintaining and improving the academic level of their members through discussions of their research results. Academic societies also aim to establish their presence as entities with a public nature by publishing journals periodically. As they are not profit-oriented, their journals are often inferior in terms of design attractiveness, readability, and user-friendliness. On the other hand, commercial publishers issue journals in

their specialized fields while placing emphasis on profitability. Accordingly, editors take a strategic and flexible approach when choosing and arranging articles so as to have a great impact on, and attract the attention of a wide range of readers. The contents typically cover over multiple fields, something which cannot be achieved by individual academic societies. Although these publishers have been striving to survive by upgrading their information services for authors and readers, such as providing online journals, they are struggling with extreme competition, except for a few high-class journals.

Academic Journals Benefiting Both Authors and Readers

The situation surrounding academic journals may appear not to pose a problem for researchers who wish to submit articles, but rather gives them an advantage, in the sense that it provides them with more publication options. On the other hand, this situation is a problem for researchers who read journals, because it forces them to search for the information they need from an enormous quantity of publications. This forces them to spend a great deal of time searching for information and also imposes indi-

rect expenses. Furthermore, the wide dispersion of significant research results for a given research field creates a very serious risk. Broadly speaking, it can erode a sense of discipline among researchers and threaten their identity.

In fact, this is the primary reason for STAM's existence. STAM has taken on the mission of making a great contribution to the development of the field of materials science, by preventing the dispersion of information in this field, and by looking across the entire field and clarifying the trends occurring there. According to this principle and while flexibly incorporating publishing know-how and strategy in our editorial policy, we demonstrate STAM's merits that may appeal to contributors, such as its publicity power and its IF. We also provide additional services that may arouse the interest of readers. More specifically, as a service for authors, we focus on ensuring that the contribution of their articles to STAM will greatly benefit them both on a short-term and long-term basis, whereas for readers, we are committed to helping them easily grasp the trends in the field of materials science as a whole, and quickly discover new seeds of innovation. Through these activities, STAM is aiming to become a unique and comprehensive journal in materials science.

< History of STAM >

- 1999 Recognizing the need for world-level Japanese academic journals, the Ministry of Education, Science, Sports and Culture created a special grant category of Grants-in-Aid for Scientific Research (KAKENHI) designated for publication of specific international journals. To apply for this grant, 18 academic societies came together to establish the Japan Federation of Materials (JFM) with Tsuyoshi Masumoto as its representative. The JFM's grant application for publication of a new international academic journal was accepted.
- 2000 STAM was inaugurated with Tsuyoshi Masumoto as its editor-in-chief. STAM, edited and managed by the Department of Materials Engineering at the Faculty of Engineering of the University of Tokyo, is published by the Elsevier KK.
- 2005 Teruo Kishi took over the role as editor-in-chief. With an ethos of "support, in the field of materials science in which Japan has an edge, the functions of a journal that can counter the dominance and oligopoly of Western academic journals," NIMS took over the editing and management of STAM. NIMS exerted efforts to strengthen the journal by solidifying the publication base: internationalizing the editorial board, establishing a peer review system, attaining a higher impact factor, and introducing advanced publishing technology.
- 2008 STAM was converted into a "gold" open access journal (free to publish and free to read). The publisher was changed to IOP Publishing, a U.K. publisher experienced in open access journals. In shifting to open access, the publication was overhauled by reviewing the expenses and employing a new editing strategy for raising the quality of the journal, such as improving the peer review process and creating a referee database. In addition, Creative Commons Licenses were adopted for protecting the copyright on articles.
- 2009 A Regional Editorial Board was set up with editors from eight countries taking the lead in the materials science research community. Also, the network for communicating information in and outside Japan was strengthened.
- 2011 The annual article downloads reached 290,000 with an average of 250 views per article. The editing effort to raise the quality of the journal and the publishing strategy adopted upon the shift to open access succeeded in dramatically increasing the visibility of articles. Such improvement efforts included the release of an application for easy viewing articles on iPhones and other mobile Internet devices.
- 2012 STAM was introduced in overseas scientific news media, blogs and journals. It recorded an annual average of 600 views per article. An article published in STAM won an award in the ACerS Awards 2013 from the American Ceramic Society.
- 2013 Toyonobu Yoshida was appointed as editor-in-chief. STAM achieved an impact factor of 3.752 (ranked first among the journals published in Japan in the category of Materials Science & Multidisciplinary). An article processing charge (APC) was introduced in July to cover a part of the publishing expenses. NIMS will continue to provide financial support to STAM.

Profile

Toyonobu Yoshida (for his profile, see page 6.)

Recent news from STAM

June 2013

The impact factor (IF) of STAM for 2012 reached 3.752, rising further from 3.513 in the previous year. This ranks STAM 35th among 239 journals worldwide in the Materials Science & Multidisciplinary category, and 1st among materials science journals that have been published periodically for more than 10 years in Japan. After shifting to an open access model in 2008, STAM's IF has increased remarkably, rising above 2.5 in 2009 and continuing to grow further. Owing to this IF increase, STAM is attracting attention from various quarters at home and abroad. STAM's high IF value is a result of the ceaseless efforts of editors and referees who have screened the articles to be published based on world-level standards. It suggests that the selected articles have a significant influence on the international materials science community. STAM is published by NIMS, which supports the strengthening of materials science in Japan and wide dissemination of academic research results.

March 2012

The article "Phase relationships in the quasi-ternary $\text{LaO}_{1.5}\text{-SiO}_2\text{-MgO}$ system at 1773 K" by Kiyoshi Kobayashi and Yoshio Sakka from Sci. Technol. Adv. Mater., Vol.13 (2013) p. 045006 won the ACerS Spriggs Phase Equilibria Award from the American Ceramic Society. Dr. Kiyoshi Kobayashi is a senior researcher at the Materials Processing Unit of NIMS and Dr. Yoshio Sakka is the Unit Director of NIMS.

December 2011

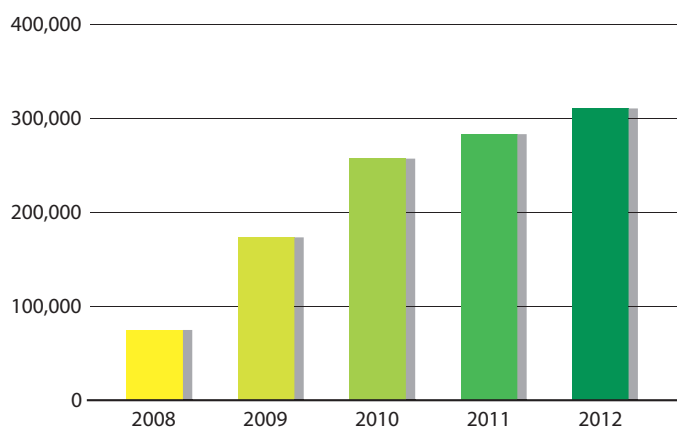
The annual article downloads reached 290,000, with 250 views per article on average.

February 2011

STAM supports reader application for mobile Internet devices such as iPhones and iPads.

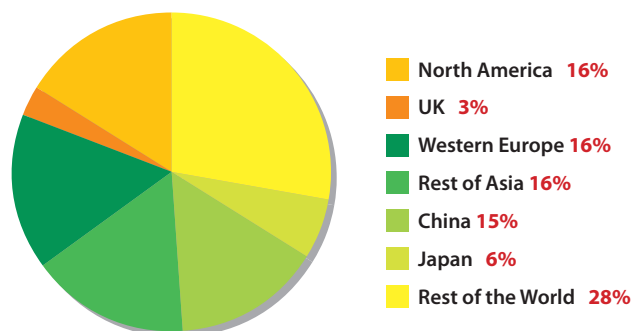
January 2011

The article "Nanomaterials Science" from Sci. Technol. Adv. Mater. Vol. 11 (2011) 050301 by the Nobel laureate Heinrich Rohrer was introduced as "Forward thinking on advanced nanomaterials" on the "IN DEPTH" page of nanotechweb.org, a nanotechnology portal site accessed by more than 55,000 readers per month.



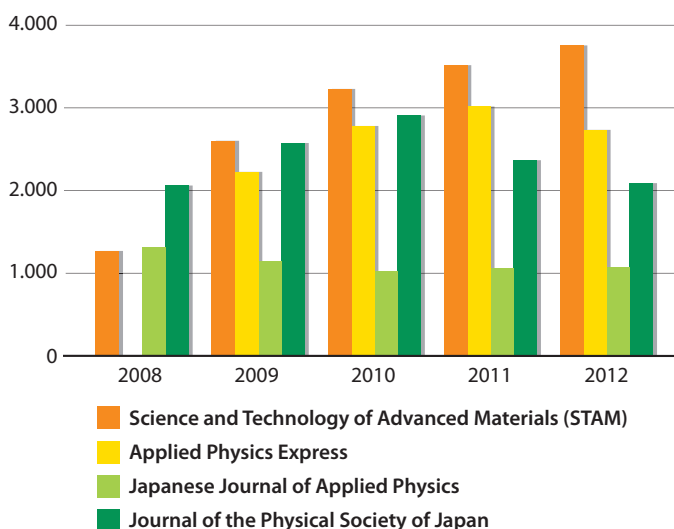
STAM downloads

Article downloads reached 310,000 in 2012 (600 per article), and continues to increase.



Percentage of readers in the world

STAM has high access rates and its readers are evenly spread around the world.



STAM IF trends

The IF of STAM is comparable to those of well-established materials science journals worldwide, and is the highest in Japan.

STAM's Objectives: The Past, Present, and Future of Academic Communication

Scientific Information Office
Mikiko Tanifuji

Academic Journals in Transition

In 1450, Johannes Gutenberg invented the first technology to enable printing of portable reproductions of texts. 110 years later, the world's first academic society, the Academia Secretorum Naturae, was founded in 1560, and 105 years after that, the world's first periodical, Philosophical Transactions, was launched. Since that time, the number of academic journals has increased dramatically in line with scientific advances. As a result of progress in digitizing academic journals in the 1990s, researchers today no longer need to visit a library to read academic literature, and can easily access journals on their laboratory computers. With a computer, a researcher can do almost anything; from collecting and reading articles, to writing, posting submissions and making presentations of his work.

The transformation of academic communication over the last 450 years has been so rapid that it is hardly sufficient to simply characterize it as the process of modernization. As national and private funding has increased for large research projects, the number of articles produced by researchers has surged accordingly. In 2012, nearly 230,000 articles in the field of materials science alone—and 2.4 million articles in all fields—were published worldwide. Publication in academic journals has now become an attractive investment opportunity, affected by diverse factors, such as the ever-increasing

amount of research activity and the growing number of readers. The net revenue reached \$9.4 billion in 2011 and the total number of peer-review journals reached 28,000 in mid 2012. Articles that can enhance the value of journals are now an important element of academic communication.

However, in reality, the time available for an individual researcher to read articles has not increased in proportion to the growth in the number of articles published each year. As a result, many articles are published but never read, journals are launched to fall into obscurity, and most researchers simply cannot afford either the time or the money to read all the journals available in their field. This reality raises the question as to whether academic journals are fulfilling their primary role of providing new information to the scientific community.

Journals were expected to serve as forums for (i) discussions and refereeing (peer review) on new findings in particular research fields, and (ii) presentation and sharing of such findings through publishing. Today, more emphasis may be placed on other roles of journals, namely, (iii) recording, registration and preservation of findings, and (iv) increasing the scientist's reputation for the purpose of employment or promotion.

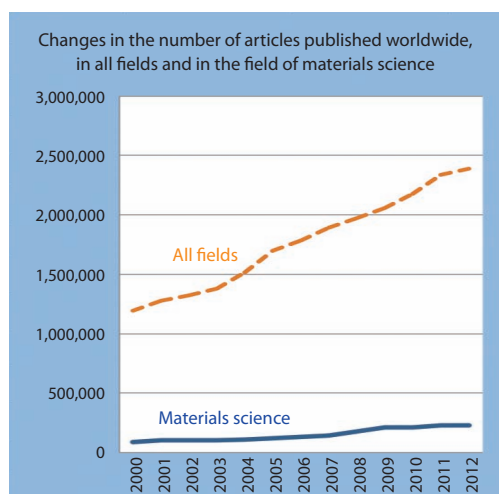
STAM's Aims in Academic Communication

NIMS, being the only research institute in materials science in Japan, decided to support the publication of STAM in 2005. By using its institutional knowledge and its network of experts, NIMS aimed to create a leading academic journal which could survive in the global marketplace.

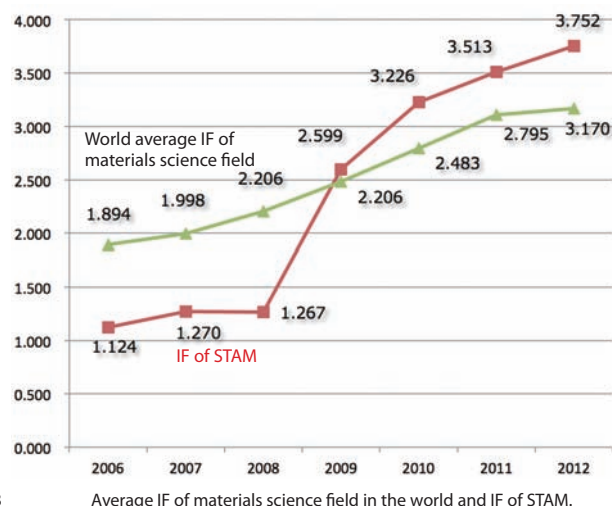
STAM, which will celebrate its 15th anniversary in 2014, currently ranks at the top among journals published by Japanese organizations in materials science. Along with its claim to be a "world-class journal originating in Japan", STAM has introduced pioneering measures in Japan, such as shifting from a subscription-based to an open-access model. With the emphasis on constantly enhancing the quality and improving the economic efficiency of STAM, together with its ability to disseminate materials globally, NIMS is striving to make a significant contribution to the future development of materials science in Japan.

By presenting excellent research results in reader-friendly articles, STAM aims to make useful information accessible to everyone, not only in the field of materials science, but also in related fields, such as biomaterials and next-generation energy materials.

Through these efforts, NIMS is endeavoring to make STAM the first choice as a forum for presenting advanced and unique articles, with the goal of establishing STAM as a pre-eminent journal in the development of materials science.



Source: SCOPUS
Data as of October 18, 2013



Profile

Mikiko Tanifuji (for her profile, see page 7.)

Providing and Receiving Scientific Information The Unique Role of the NIMS Scientific Information Office

NIMS Planning Division,
Scientific Information Office

The Scientific Information Office was established in 2008. It combined the library function of the Administration Division with a publishing function as a new core activity, aiming to both receive (library) and provide (publishing) scientific information. In general, libraries and publishers are known to be incompatible entities. We have a unique office in which the library operations and the publishing functions support each other. By using the expert knowledge of both libraries and publishers, we have developed and provided new Internet information services, such as a web portal; a novel infrastructure innovation in providing scientific information.

Publishing service: High international communication ability

In addition to editing and publishing the journal introduced earlier in this special issue, NIMS has started a new service of publishing e-books in English about its field of expertise, materials science, as NIMS Monographs series (Fig.1; <http://www.springer.com/series/11599>). The series was launched in April 2013 in collaboration with Springer. NIMS Monographs is a specialized series of books written by NIMS researchers to provide graduate students and other experts with the specialized research experience and knowledge of NIMS, Japan's leading research institute. The series covers a wide range of subjects from principles and theories to examples of the latest applications.

Taking advantage of electronic publishing, the NIMS Monographs series provides not only information in static text, but also dynamic links to illustrations, photographs, videos and analysis software as reference data, thereby making full use of the modern publishing technology.

Library service: Next-generation library catalog service, OPAC for e-resource management

NIMS offers library facilities where both internal and external users can read and borrow books. In addition, NIMS has developed and operates a library portal site (library.nims.go.jp) which allows users to cross-search e-resources (online journals, e-books, databases, etc.) scattered across the Internet, reserve library books, and request photocopies of documents (Fig.2).

"Next-L Enju," the core database of the portal site, is highly customizable and scalable software that can be installed at low cost. The entire system, including the self-checkout terminal interface, supports both Japanese and English for the convenience of foreign users who constitute 20% of all NIMS researchers. It is a next-generation navigation system that allows cross-search of not only paper materials, but also online journals, e-books and institutional repositories as NIMS' library resources.

Users can also search through external databases via a link resolver, or retrieve the search results in the form of an RSS feed. The system

can coordinate with external systems through a web API, and it can be used on mobile electronic devices such as smartphones.

Since NIMS's development results are released within the open-source model, they can be used by other institutions as well.

Information service: The Use of digital library NIMS eSciDoc as an outreach

Institutional repository systems have an increasing importance in society and a substantial effect on research. Accordingly, NIMS has redeveloped its long-accumulated research result database into a digital library system, NIMS eSciDoc, based on international specifications, equipped with a self-archiving function and a library collection function for promoting the outreach of the archived information.

The NIMS Researchers Directory "SAMURAI" makes such accumulated, consolidated and structured information on NIMS researchers available to outside users (Fig.3). This information can be used for a literature list, or for a CV attachment when applying for research funds, or be processed with a software gadget for a webpage introducing the research results of a research group.

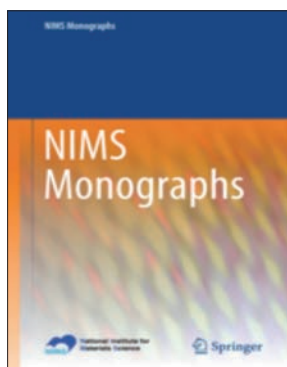


Fig. 1 NIMS Monograph series Series Ed.: Naoki OHASHI, ISSN: 2197-8891

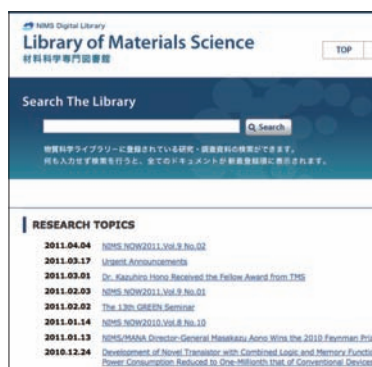


Fig. 2 Library portal site (library.nims.go.jp)

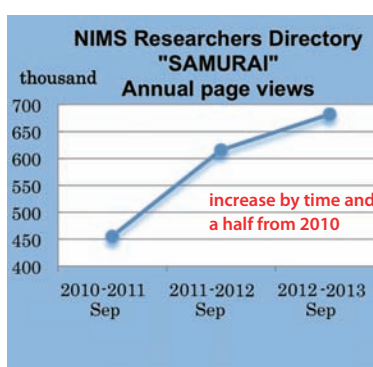


Fig. 3 SAMURAI annual page views and sample page.



NIMS NEWS

1 NIMS Forum 2013 Held in Tokyo

On October 24, 2013, NIMS held its 13th forum in the Tokyo International Forum (Yurakucho). NIMS has been holding this event annually in the hope of more widely publicizing its research results. This year, under the main theme "Gathering New Materials and Substances for the Future of Energy," an oral presentation session focused on energy materials and a poster viewing session exhibiting selected research results were held. As has been the case every year, the event site was filled with the excitement of attendees eager to directly exchange views with

researchers. The oral presentation session featured special presentations by two guest speakers: Ms. Makiko Ono, Chief Researcher of the Industry Research Division of Mizuho Bank Ltd., spoke on "Achievement of Clean and Economical Energy," and Project Professor Shozo Kaneko from the Institute of Indus-

trial Science at the University of Tokyo spoke on "Trends in High Efficiency Thermal Power Generation and the Importance of Materials." NIMS also demonstrated its research results in relation to these presentations. The event as a whole was greatly appreciated by the approximately 600 attendees.



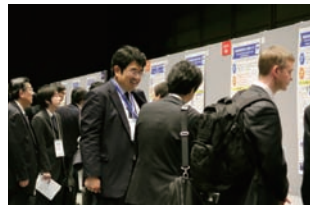
Opening address by NIMS President Prof. Ushioda.



Special presentation by Ms. Makiko Ono.



Special presentation by Prof. Shozo Kaneko.



The event site, filled with attendees.

2 French Minister of High Education and Research visits NIMS

On October 7, 2013, her Excellency Geneviève Fioraso, Minister of High Education and Research, the Government of France, accompanied by Prof. Manuel Tunon de Lara, President of Bordeaux University, and high-ranking officials made a visit to NIMS. Minister Fioraso attended the Annual Meeting 2013 of STS forum (Science and Technology

in Society forum) in Kyoto, she then visited several research institutions in Tsukuba including NIMS. The Minister met the Executive Vice Presidents of NIMS and listened to the overview presentation, with emphasis on the collaboration with industries, and to the special collaboration with Saint-Gobain and CNRS of France. We earnestly believe

that Minister Fioraso's visit was an excellent opportunity to promote ever further the collaboration with French universities, public research institutions, and industries.



Delegation and NIMS attendees.

3 NIMS Signed a Comprehensive Collaborative Agreement with NanoNextNL, Netherlands

On October 9, 2013, a Comprehensive Collaborative Agreement (CCA: Memorandum of Understanding for a sister institute) was signed by President Prof. Dave Blank of NanoNextNL and President Prof. Sukekatsu Ushioda of NIMS to pursue collaboration in the fields of mutual activity in the nanotechnology area.

NanoNextNL is a consortium of more than one

hundred Dutch companies, universities, knowledge institutes and university medical centers, which is aimed at industry driven research into micro and nanotechnology. A comparison of the NIMS and NanoNextNL research programs has revealed "hot spots" in the available matching activities and interests, and both sides are now discussing pursuing the promising possi-

bilities envisaged in the agreed collaboration.



Meeting at "nano tech 2013" (from left, Mr. Paul op den Brouw, Innovatie Attaché from Dutch Embassy, Business Director Mr. Dick Koster, Dr. Johsei Nagakawa, Deputy General Manager of Academic Collaboration Office, President Prof. Sukekatsu Ushioda, Vice President Prof. Fred van Keulen, Dr. Masakazu Aono, Director General of MANA, and Executive Vice President Dr. Junichi Sone)

Hello from NIMS

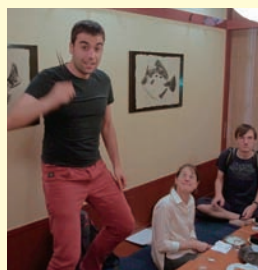
Dear NIMS NOW readers,

Before my arrival to Japan, my knowledge about this exotic country was only reduced to the history of the samurai. In January 2008, I had my first experience with Japanese culture during a very short internship at Tohoku University. After working in different research laboratories in the period between 2008 and 2012 (Madrid, Sao Paulo and Paris), I returned to Japan, to a different city, Tsukuba. Tsukuba is a world-class Sci-

entific City which attracts researchers from many different countries. My research career at NIMS is very fruitful. In addition, I am enjoying the advanced Japanese technologies and facilities. I also visited many sightseeing places: Nikko, Yamagata-Zao, Sendai, Matsushima, etc. I really like Spring, in particular the cherry blossoms (Hanami) in the middle of March. My Japanese experience will be unforgettable.



Jacob Torrejon Diaz (Spanish)
from November 2012-
Post-doctoral position at magnetic
Material Unit (Spintronic group)



"Spintronic group party" in a Tsukuba restaurant.



At Nikko during Christmas time.



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To subscribe, contact:

Dr. Kazuo Nakamura, Publisher

Public Relations Office, NIMS

1-2-1 Sengen, Tsukuba, Ibaraki, 305-0047 JAPAN

Phone: +81-29-859-2026, Fax: +81-29-859-2017

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R100
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Paper pulp 100%

