

# INORGANIC CHEMISTRY DIVISION COMMITTEE OF IUPAC

## Minutes of Meeting at San Juan 29 and 30 July 2011

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## INORGANIC CHEMISTRY DIVISION COMMITTEE OF IUPAC

Meeting at San Juan, Puerto Rico July 29 - 30, 2011

### DRAFT MINUTES

**Attendance:** Present were *President*, Robert Loss (Australia); *Vice President*, Jan Reedijk (Netherlands); *Past President*, Kazuyuki Tatsumi (Japan), *Secretary*, Leonard Interrante (USA); *Titular Members*: Tiping Ding (China/Beijing), Javier Garcia-Martinez (Spain), Norm Holden (USA) Sanjay Mathur (Germany), and Ken Sakai (Japan); *Associate Members*, Tyler Copen (USA, Lars Öhrström (Sweden); *National Representatives*, Tara Dasgupta (Jamaica) and Ling-Kang Liu (China/Taiwan); *Young Observers*, Miki Hasegawa (Japan), Daniel Rabinovich (U.S.A.), Justin Youngblood (USA) and Illya Zharov (USA) and, *Guest*, Henrique Toma (Brazil).

**Apologies** were received from *Titular Member* Pavel Karen and *Associate Members* Milan Drabik (Slovakia), Markku Leskela (Finland), and Aldo Bologna Alles (Uruguay), who could not attend.

#### 1 – Introductions and announcements (R. Loss)

The meeting commenced at 9:15 a.m. on Friday, July 29, 2011. Div. Pres. Loss welcomed the members and guests who introduced themselves and described their professional affiliations and areas of expertise. Arrangements for a Division II dinner during this meeting were discussed and Interrante agreed to look into a location for this dinner at 8:30 on Saturday (tomorrow).

#### 2 – Presentation and discussion of the Agenda (Loss, Interrante)

The previously distributed Agenda was accepted by President Loss with the addition of reports by representatives from other IUPAC Divisions and Committees.

#### 3 – Approval of Minutes from Division Meeting in Glasgow (Interrante)

Copies of a draft of these minutes were previously distributed by email and are available on the IUPAC Division II web page. These Minutes had been distributed in draft form previously and amended according to corrections and comments received from the Division members. The resulting final version of the Minutes were approved without further change.

#### 4 – Report on the status of the action items from the Glasgow meeting; appointment of a Division member to record a list of action items for this and the next Division meeting (Interrante, Loss)

The action items from the Glasgow meeting were included in the Minutes of that meeting as Appendix 2. All of these items had been addressed by the designated individual. Copen agreed to note the Action Items for the current meeting, which are included in these Minutes as **Appendix 1**.

### **5 – Report on the Spring 2011 IUPAC Bureau Meeting (Loss)**

The Bureau met in Warsaw, Poland on April 8-10 2011. A copy of the Report on Division II that Div. President Loss presented to the Bureau is attached to these Minutes as **Appendix 2**. Loss reviewed the main items that were discussed at this meeting, including the status of the 2010-11 Div. II expenditures. We have underspent our allocation for administrative expenses, due to the decision not to hold an off-year meeting in 2010. Secr. General Black noted Projects that include interactions with other IUPAC groups would be given special consideration and priority for Project Committee funding. Tatzumi suggested that we try to use funded Projects to supplement attendance at our off-year meetings. Interrante noted that our Helsinki meeting had been directly responsible for generating two most recent Projects in the “Molecules” area. Reedijk agreed that these off-year meetings are an important source of new Projects and ideas for future Projects and indicated that we would be arranging an off-year meeting for 2012. We discussed the time and location for the 2012 off-year meeting and discussed the pros and cons of having this meeting coincide with various international meetings in the area of inorganic chemistry that were scheduled for that year. However, it was finally decided to accept the suggestion of Mathur that the meeting be scheduled independently in the Fall, 2012 at his Institute in Cologne, Germany. After further negotiation conducted by email after the GA, the dates for this off-year Division meeting were set for September 6-8, 2012.

### **6 - Report from IUPAC Officers - K. Tatsumi, IUPAC Vice President (and Past President of Division II)**

Tatsumi indicated that the Budget for IUPAC was in pretty good shape, but that we need to collaborate and bring in funds from other sources to supplement IUPAC funding. We should use Project funds wherever possible to bring people to Division meetings. After a 20 minute coffee break, the meeting was reconvened at 11:05am.

### **7 – Report from the nominating committee for the 2011 TM election; list of 2012-13 Division Members (Reedijk)**

Vice-President Reedijk reported on the results of the 2011 Division II election of TMs for the 2012 - 2013 term. The election was already held in 2010 through ballots distributed by the Secretariat. According to the current Rules, TMs are now elected for 2 years, with the possibility of re-election for 2 more years only.

The results of the election were as follows:

1. Division secretary for 2012-2015: Prof. Dr. Markku Leskelä (Finland)
2. Titular members for 2012-2013: Profs. Milan Drabik (Slovakia), Lars Öhrström (Sweden) and Edit Tsuva (Israel).
3. Associate Members for 2012-2013: Profs. Tipping Ding (China), Javier Garcia-Martinez (Spain), Rose-Noelle Vannier (France), Joseph Buchweishaija (Tanzania), Daniel Rabinovich (USA), and Adem Kiliç (Turkey)
4. National Representatives for 2012-2013: Prof. Dr. Yang Farina Abdul Aziz (Malaysia), Dr. Biserka Prugovečki (Croatia), Prof. Sujittra Youngme (Thailand), Prof. V.

Chandrasekhar (India), Prof. Natasha Trendafilova (Bulgaria), Prof. Henrique E. Toma (Brazil).

A complete list of Division members for the next biennium with their terms of office is attached to these Minutes as **Appendix 3**.

## **8 – Reports by Division members on their activities in connection with the International Year of Chemistry (IYC)**

Garcia reported on the Global Initiative on Water Quality, which grew out of a CCE Project (2010-011-1-050) that he and Anthony Wright (NR of CCE) co-chaired, entitled “Global Chemistry Experiment for the International Year of Chemistry — Design and Development”. This project was intended to bring together partners to (a) plan, (b) prepare a case for support and (c) submit funding applications required to organize a global chemistry experiment focused on the context of water as a major contribution to global activities to be carried out during the International Year of Chemistry in 2011. The project also was designed to:

- Develop the experiments – testing experiments to establish suitability and developing resources to support the experiments
- Develop educational materials for the activities around the experiments
- Develop an implementation plan for 2011 –
  - the infrastructure for implementation
  - the community of chemists and educators from around the world to support the project
  - the funding required to enact the experiments.

As of June 2011, this Project had led to a global initiative involving more than 10,000 students from 500 schools in many countries throughout the world who are carrying out a series of experiments relating to water quality in their environment. The results are uploaded to a website (<http://water.chemistry2011.org/web/iyc/home>) which displays the results in various ways, including an interactive map showing the pH and temperature of a local water source. The June Report on the Global Water Experiment, shared during our meeting can be found as a separate document on the Division webpage. According to the GWE website:

The Global Experiment directly addresses the IYC goal of "Increasing the public appreciation and understanding of chemistry in meeting world needs and encouraging interest in chemistry among young people." The central theme of the experiment is “Water: A Chemical Solution”. This provides an outstanding educational opportunity for students to learn about water and the challenge of meeting the Millennium Development Goal of greatly improving access to safe drinking water before 2015. This activity will be used to emphasize the close relationship between water and climate change, human health, and energy security.

The theme for the global experiment project— “Water: A Chemical Solution”—implies the dual meaning of “solution.” First, solutions are the answers that chemistry can provide to questions about delivering safe water to people all over the world. Second, in the chemical sense, the term is helpful for introducing important chemical principles such as pH, salinity, and solubility. In the global experiment, teachers will involve classes of students in the investigation. Consider for a moment how many students might participate—100 countries, 1 000 schools per country, 10 classes per school, and 10 students per class would lead to millions of participants and a giant experiment! With such an extensive reach comes a responsibility

to achieve valuable educational goals. The context of water provides relevance and the experiment will give students learning experiences that are engaging and edifying so that they learn valuable practical skills and useful chemistry. At the same time, students will discover the power of chemistry to provide reliable information and data within our society.

Four experiments were designed to test the properties and quality of water in the student's environment:

#### Experiment 1: Acidity

In this activity students will be learning about acidity, one of the most common chemical properties encountered around the home. At the same time they will be learning good experimental techniques to test the reliability of their results.

#### Experiment 2: Salinity

This activity will give students the opportunity to use either a homemade or commercial meter to measure the conductivity of water samples. Students will learn about salts and determine concentrations of salts in solutions.

#### Experiment 3: Filtration

In this activity students will use household materials to build a water filtration unit and identify the efficiency of different filtration materials. Then, as a follow up, they will carry out a treatment of the water.

#### Experiment 4: Solar still challenge

In this activity students will explore an alternative way of purifying water using a solar still, learning about the distillation process and the states of matter. The activity will provide students with the opportunity to design and build their own more efficient stills.

The activities of the Global Water Experiment were designed to be undertaken with equipment and materials commonly available in a school laboratory. However if preferred, a kit especially designed for carrying out the activities in the Global Water Experiment can be purchased from the Radmaste Centre at the University of Witwatersrand in South Africa. Adapted experimental protocols have been developed for these kits to ensure consistency with the Global Water experiment.

A Symposium was organized for the 2011 WCC by Javier and Peter Mahaffy (CCE) called: "The Chemical Element: Chemistry's Contribution to our Global Future". This half-day symposium was divided into short presentations and finished by a panel on the theme of the meeting. This symposium aimed both to celebrate the many contributions of Chemistry to mankind and also to rethink and coordinate how we can better use chemistry technologies, innovation and understanding to tackle critical issues such as energy and food security, water, sanitation, health and hunger under the umbrella of the Millennium Development Goals. The speakers of this timely symposium, very much connected with

the goals of the IYC, included: R. de Jonge, J. Apotheker (the Netherlands), M. F. Ostrowski, E. Steenberg (US and South Africa), and R. Sigamoney, J. Hasler (from UNESCO).

A second day-and-a-half symposium, entitled “Advanced Nanomaterials for Energy Applications”, also organized by TM Javier Garcia-Martinez, included over 10 oral presentations and a round table on how nanotechnology can contribute to create new materials needed for the sustainable production, storage and use of energy. The theme of the symposium is at the core of the objectives of the International Year of Chemistry and included: M. Herranz (Spain), W. J. Youngblood (US), M. Leskela (Finland), R. S. Varma (US), R. Luque (Spain), S. Hunyadi Murph (US), V. Chitturi (US), V. S. Puli (Puerto Rico), A. L. Reddy (US), T. M. Tritt (US) and L. Arroyo-Ramirez (Puerto Rico).

Sanjay Mathur described various activities that he was involved with in connection with the IYC, including a Student Chemistry Cartoon Competition in which he served as one of the 5 judges (<http://www.chemistry2011.org/participate/activities/show?id=361>). This competition was sponsored by the Division of Physical and Biophysical Chemistry of IUPAC and Jim McQuillian of that Division was the contact person. The goal of the competition is to clearly illustrate a chemistry principle in a manner that can enrich the teaching of chemistry.

The winner of the competition was invited to attend the 43rd IUPAC Congress in Puerto Rico, USA (July 31-August 7, 2011) where a \$1000 prize was presented and the finalist cartoons displayed. Merit prizes of \$100 were awarded to 5 other students whose cartoons were chosen as finalists.

The following additional activities involving the Division II members on behalf of the IYC were included in a report to the Council prepared by Division President Loss and are reprinted here to provide a more complete account of the extent of the Division’s activities:

- The largest active IYC-2011 related project is a collaborative project with CCE under the Task group leadership of Dr Norman Holden (Div II AM). The project is well underway with the production of a novel periodic table, focusing on the isotopic composition of the elements and the specific application of isotopes in Science, Technology and Industry. The Table will be available in several different formats and will include support for chemical educators. The primary target audiences are chemistry students and chemistry teachers, and will be ready for distribution following the GA.
- *VP Jan Reedijk*  
Jan reported about the opening of IYC for the Netherlands on January 27. The opening was attended by a Government minister, and a CEO of AKZO-Nobel, the chair of the research council (NWO), and the President of the academy of sciences. The Dutch IYC site <http://www.jaarvandechemie.nl/nieuws-en-verslagen/artikelen/minister-verhagen-luidt-themajaar-chemie-in> is listing many activities and events for the IYC.

- *AM: Markku Leskelä*

Provided a report too lengthy to include here. Briefly, Markku is chairing the Finish IYC organizing committee, which has wide representation from Finnish chemical industry, science museums, teachers association, university, and ministry of education etc, overseen by the Association of Finnish Chemical Societies. The organization committee started work in September 2009, and at that time was already busy in planning and finding of sponsors. They have huge number of activities all over in Finland divided according to target audiences: e.g., public school professionals and media. There are 23 companies and 3 foundations as sponsors. Markku reports considerable success with the media group where professional people such as public relations, managers from companies, radio reporters etc, has made special programs covering 6 IYC events specifically for journalists. I would personally like to congratulate Markku for the level of IYC activity generated in what is a relatively small country. Some examples of IYC activities that have taken place include:

- The opening of the International year of Chemistry took place in January in connection to the Science Days (Tieteen Päivät). The opening ceremony contained three lectures, which were dealing with carbon dioxide as a raw material, development of pharmaceuticals and bio fuels – all themes of the IYC. The Science days had also two other sessions on chemistry, workshops during science night and a separate lecture from the life of Marie Curie. All these events gathered more than 600 people.
- The major event for professional chemists was a Chemical Congress and the ChemBio exhibition in March 22-24, which attracted 250 participants.
- The main event aimed for public was held in May 12 in Helsinki on Narikkatori. There was a large tent with a main stage, 8 stands for the main sponsors and organizers, places for barbecue and soap bubble competition. The program on the stage was extensive and where main speaker Fredi Lilius interviewed more than ten experts and the topics vary from bio fuels for transportation to clean water, new pharmaceuticals for Parkinson disease, fuel cells, thin coatings for silver, composites made from natural fibers etc. In addition there were interesting and popular science shows given by Heko Montonen from Science Centre Heureka. In addition, the public could taste and compare meat grilled with gas and coal grill and take part in the soap bubble competition. The day was very successful and some 5500 people visited the place. The event received also attention in radio and TV.

- *P Bob Loss*

Attended an IYC Women in Chemistry breakfast at the Western Australian Technology Park. This worldwide event was held the day before the official IYC opening and involved a video linking of venues around the world.

- *TM Lars Öhrström*

Has participated in the conception and preparation of the material "Periodic Table of the Movie Stars" for the western Sweden IYC activities.

- *TM Milan Drabik*  
Has been involved with the production and dissemination of Info leaflet with the summary of IYC related activities in Slovakia (available on request). Milan also attended the official launch ceremony (January 17th) of a Slovak postage stamp commemorating the IYC (activity of issuing the stamp is listed also in the IYC web site). Milan also participated in the official IYC Launch ceremony in Paris.
- IYC activities in Taiwan - *Ling-Kang Liu*.  
The IYC2011 activities in Taiwan include the construction of a chemistry demonstration truck, with which volunteers of Chemical Society Located in Taipei tour around the island, visiting junior and senior high schools and community colleges in order to promote "chemistry our life and chemistry our future." The activities have been designed for people to see and to read (around 30 different posters constantly carried along in truck), for people to do (DIY experiments), and for people to listen to (both general lecture series and talk-to-laurate lecture series).

Also integrated into the IYC2011 scheme in Taiwan is a "Magichem" performance which involves the participation of faculty members and students from the drama department.

## **9 - The Division newsletter (Reedijk)**

As has been our recent practice, as Vice-President, Jan Reedijk assumed the responsibility for preparing the Division Newsletters for the current biennium starting in 2010. Electronic copies of the two (2010) Newsletters have been distributed to the Division members and the officers of the other Divisions and are also posted on the Division webpage of the IUPAC web site. He was currently collecting input for the next (third) Newsletter, which will be published later this summer, and asked the members present to please send their contributions to him by August for inclusion in this Newsletter. He also asked the Division members to distribute the newsletter to their respective communities.

## **10- Review of Division budget allocations and expenditures (Loss, Coplen)**

Coplen reported that, compared to our Glasgow GA Meeting, where we had 17 ½ Projects, of which 4 had been completed, our current situation was quite similar. We currently have 18 funded Projects, with 3 completed and 5 extending past their planned ending date. In terms of Project completions, we are doing well compared to the other Divisions, although the number of current Projects is one of the lowest among the Divisions (the average is 28, with two having over 40). Further discussion of this item was deferred until tomorrow, when Div. Pres. Loss was expected back at our meeting (this Item is continued on p. 13 of these Minutes).

We next heard a scheduled report by Peter Mahaffy, Chair of the Committee on Chemical Education, which is summarized below under Item 13. This was followed by a brief report from Jim Bull, Editor of Pure & Applied Chemistry, who was making the rounds of the Division Meetings. This is also included under Item 13.



### **11- New Elements: Validation of Claims and Naming – Status of the naming of Element 112 (Corish)**

A report was published by the IUPAC/IUPAP Joint Working Group on the claims for elements 114 -118. Two elements, 114 and 116 met the criteria and are added to the Periodic Table. The next step is the proposal of names for these elements, and two-letter abbreviations, by the discoverers (a Dubna-Livermore collaboration), which are then sent to Division II for its approval. The discoverers have been invited but have not yet responded. The completion of his step in the process is expected in October 2011. These names and symbols are then put before the Executive Committees of IUPAC and IUPAP for their agreement, after which a 5 month public review period will commence. Evidence in the cases of elements Z = 113, 115, and 118 did not meet the criteria for discovery.

The Inorganic Chemistry Division will examine the proposed name and symbol for suitability and, if satisfied, take these through accepted IUPAC procedure. This, briefly, consists of sending the recommendation to 15 experts, officers of other interested commissions, the Interdivisional Committee on Terminology, Nomenclature and Symbols, the National and Regional Centers and interested individuals. IUPAP's opinion will also be sought. Should difficulties arise in any of these processes that make the proposed name unacceptable, then the Inorganic Chemistry Division will correspond with the laboratory or laboratories concerned to seek their agreement to any necessary changes or to an alternative name suggested for its consideration. When these processes are complete, the President of the Inorganic Chemistry Division forwards the Division's final recommendation for the name of a new element to the IUPAC Council for formal approval by the Union and publication in Pure and Applied Chemistry.

### **12- Report from the Subcommittee on Materials Chemistry (Interrante)**

The Interdivisional Subcommittee on Materials Chemistry met on the afternoon of July 28 (yesterday) as part of the GA. The meeting was attended (all or in part) by 16 people, including Interrante, Mathur, Öhrström, Reedijk and Sakai from Division II, McQuillan, Rossi and Wilson from Division I, Ober and Jones from Division IV, Hutton from Division VIII, 4 Young Observers (Hasegawa, Zharov, Hurrey and Youngblood) and Past IUPAC President Jin. Among the topics discussed were the type of Projects that could be generated by the ISMC, where the synergistic interaction of members from different Divisions and backgrounds with a common interest in materials chemistry could lead to Projects that are unlikely to be developed by the independent Divisions owing to the interdisciplinary nature of materials chemistry. An example that was suggested at our last meeting and for which a Proposal is currently being developed is a website dedicated to education in materials chemistry, modeled along the lines of C. Ober's highly successful polymer education website (<http://www.iupac.org/polyedu/>). A non-exhaustive list of possible areas for materials chemistry Projects was generated which included:

- Nomenclature, deemed to be of increasing importance, especially for electronic retrieval and search of materials such as polymers and composite materials
- Photoactive materials (see also current project by A. Griesbeck)

(<http://www.iupac.org/web/ins/2008-037-2-300>)

- Metal-organic frameworks (MOF's). Here nomenclature and terminology issues are emerging as well
- Teaching materials chemistry
- Measurement Standards and References in H<sub>2</sub>O-splitting/solar hydrogen technology
- Metrology aspects and standardization in advanced materials

As far as the organization of the ISMC for the next two years is concerned it was unanimously decided that C. K. Ober of Division IV will be chairman and that an off-year meeting be called next year. In order to minimize its cost this meeting should coincide (spatially and temporally) with the off-year meeting of one of the participating Divisions. An invitation will be extended to the other Divisions to send representative(s) to this, and the next ISMC GA meeting. A copy of the Minutes for this meeting can be downloaded from the ISMC webpage (<http://www.iupac.org/web/ins/205>).

### 13- Reports from other IUPAC bodies and Affiliated Organizations

#### Committee on Chemistry Education (P. Mahaffy, Chair)

Peter Mahaffy, Chair of the CCE gave an oral presentation to the Division in which he described some current CCE activities and Projects. Their number one priority in the current biennium has been to support the IYC. In this connection, **the Global Water Experiment** that grew out of Garcia's Project has outshined all of the other activities connected with chemistry education undertaken in the IYC. A major concern in undertaking this and all other activities has been to insure that the ideas and activities generated will not die at the end of 2011. As part of the Global Water Experiment, kits were designed for carrying out the activities in the Global Water Experiment, which can be purchased from the Radmaste Centre at the University of Witwatersrand in South Africa. Funds for the purchase of these kits are being solicited from potential sponsors for use in poorly resourced settings. These kits are a legacy IYC item, and will permit microscale chemistry to be carried out far beyond 2011.

A complete list of list of the CCE priorities follows:

- (a) To maintain a primary focus on working with other partners and stakeholders to implement the International Year of Chemistry
- (b) To foreground the importance of learner-centered chemistry curriculum and education, both in the developed and developing world. The extent to which this is done should be one criterion used to assess educational projects.
- (c) To give priority to initiatives that highlight the relationship between chemistry and sustainable development, consistent with the goals of the IYC and the UN Decade for Education for Sustainable Development.
- (d) To build chemistry education networks, using fully the multicultural competence within CCE.
- (e) The biennial International Conferences on Chemistry Education are flagship activities for CCE. We continue to seek to more fully integrate ICCE activities into the work of CCE and use ICCE conferences to report the outcomes of CCE projects and bring participants

together to implement CCE strategies

(f) To continue to support initiatives that raise awareness and understanding of ethical issues that are important in chemistry.

### **Visualizing and Understanding the Science of Climate Change**

Also in keeping with the UN IYC resolution that “*education in and about chemistry is critical in addressing challenges such as global climate change, in providing sustainable sources of clean water, food and energy and in maintaining a wholesome environment for the well being of all people*”, a second legacy IYC-2011 activity is the global release of a set of peer-reviewed, interactive, web-based materials to help learners visualize and understand the underlying science of climate change. These interactive materials have been created by a team of undergraduate students and faculty at the King’s Centre for Visualization in Science (King’s University College, Edmonton, Canada in partnership RSC, UNESCO, ACS, and the Federation of African Societies of Chemistry).

Another activity was the development of a “**Global Stamp Competition**”, which was open to students all over the world in 3 age categories (12-14, 15-18 and undergraduates from all subjects). The aim of the global competition is to design a national stamp that reflects on 'Chemistry as a Cultural Enterprise', showing the impact of chemistry on the culture and/or every day life. The winning stamps will be displayed during the IYC 2011 Closing Ceremony in the Grand Palais in Brussels, Belgium.

**Tool kits for National Chemistry Days/Weeks** - the goal of this project was to develop toolkits for national chemistry days and weeks during International Year of Chemistry (IYC) 2011 to raise awareness of the importance of chemistry as the central science by highlighting the applications of chemistry in daily life.

**The Flying Chemists Program** - has the overall goal to provide emerging or economically disadvantaged countries means to improve the teaching and learning of chemistry at primary, secondary, and tertiary levels. The FCP provides a country with the expertise and external sounding board to strengthen chemistry education and to assist it in its own development. Two very successful FCP program visits have been held in the past year: Croatia (November 2010), and Ethiopia (February 2011). The Ethiopia FCP program events were scheduled to coincide with the official national launch of IYC in Ethiopia, the country that led the way in obtaining designation at UNESCO and the UN. – involving either secondary or post-secondary schools – currently programs in Croatia, Ethiopia – would like to extend to Latin American Chemical Society

### **Isotopic Periodic Table (A Division II Project)**

“Many of us were taught that the standard atomic weights we found in the back of our chemistry textbooks or on the Periodic Table of the Chemical Elements hanging on the wall of our chemistry classroom are constants of nature. This was common knowledge for more than a century and a half, but not anymore.” (Tyler Coplen and Norm Holden in the feature article in the March-April 2011 issue of Chemistry International).

One of the IUPAC projects that will have great impact on the day-to-day teaching of chemistry in secondary schools is the Division II project to develop a new periodic table of the isotopes. CCE has played a very small role in supporting this project to date and looks forward to helping identify teachers to pilot the new periodic table and supporting materials, and also to help teachers prepare for its introduction into their classrooms.

These and other activities of the CCE are described in more detail in a report to the IUPAC Council that was prepared by the CCE (due to its size, this document was not included as an Appendix to these Minutes, but instead will be uploaded separately to the Division II website).

### **Report by James Bull, Editor of Pure and Applied Chemistry**

J.B. was making the round of the Division meetings and stopped by to say a few words about PAC. PAC is always looking for input and relies on the Divisions for articles. He wanted to make sure that the Divisions know this and that PAC is open to new ideas and suggestions.

### **Chemical Nomenclature and Structure Representation Division (VIII) (Reedijk)**

Reedijk, who is an Associate member of Division VIII, reported on the following CNSR activities that were relevant to Division II:

#### 1. The Inorganic PIN project:

This Project is likely to be completed in the next biannum. It deals with development of an unambiguous decision tree on how to derive a unique name (preferred IUPAC name) for any inorganic compound. Such names are needed for e.g. legal reasons, and the European Union has asked for this.

#### 2. Revision of the Red Book:

Previous editions were in 1970, 1990, and 2005. The last edition took about seven years from conception to publication, and the next one should be initiated in 2-3 years time, but after the PIN project is completed. This is primarily a matter for Div. VIII, but clearly Div. VIII will seek to involve people from Div II in a revision of the Red Book and when the project will be submitted.

### **Committee on Chemistry and Industry (COCI) (Michael Dröscher, Chair)**

The IUPAC Committee on Chemistry and Industry (COCI) is the focus within IUPAC for issues of importance to the global chemical industry. COCI is developing new programs and projects on emerging topics. It is also the conduit for communications between IUPAC and National Adhering Organizations (NAOs), Company Associates (CAs), and individual scientists.

### **COCI Objectives and Terms of Reference**

- Advise the President and Executive Committee on options and actions by which IUPAC could become more attractive to increased participation by scientists in industry;
- Develop and maintain an active program to recruit, guide and inform Company Associates;
- Develop liaisons with national and international associations that represent chemical industries, chemical societies, and international bodies involved in scientific and industrial development; and
- Initiate and maintain a portfolio of projects with implications for industry.

### **COCI Strategic Emphasis**

Projects that share best practices globally and focus on:

- Capacity building
- Public appreciation of chemistry
- The authoritative role of IUPAC as an NGO
  - Reputation and trust
  - Enabling public and political debates

Projects aligned well with *IUPAC's strategic objectives* ...

### **Chemistry Leadership in Addressing Global Issues**

- World Chemistry Leadership Meeting
  - Cornerstone IYC event August 2<sup>nd</sup> San Juan
  - Increasing the contribution of chemistry to Sustainable development and to Rio+20 World Summit
  - Regional Workshops for Company Associates *Chemistry in a Changing World*
    - Most recent Kuwait 2010
    - Company Associate Recruitment

### **Enhance chemistry education/career development and public appreciation of chemistry**

- Work with CCE on Public Appreciation of chemistry:
  - Support for restricted access Wikipedia
  - Broadening IUPAC NGO status – possible new strategic objective for IUPAC
  - Major Contribution to IYC
  - Two representatives on IYC Management Committee
  - Key component of industry liaison – Partners, Sponsors etc
  - Part of the Project leadership for the Global Experiment on Water
  - Organisation of WCLM 2011, San Juan

### **Company Associates**

- Belgium, Canada, China, Denmark, France, Germany, Hungary, Japan (30!), Korea, Kuwait, Russia, Switzerland, UK, US, and South Africa have company associates (see home page)

- Together 83 CAs (as of July 19th), some of them one year free memberships as sponsors of a IUPAC conference which might not continue their membership
- Main issue, what is the advantage to be IUPAC CA?
- In most cases link through one person – no significant interest of the company at large

COCI welcomes Projects from the IUPAC Divisions that relate to its overall objectives. If one is looking for industrial support of Projects, there is usually a \$2,500 – 3,000 limit for asking funds from industry; >\$3K generally need to go to people you know in the organization, preferably in the middle level.

### **Interdivisional Committee on Terminology, Nomenclature and Symbols (Holden)**

Holden, who is our Division's representative on ICTNS, reported that their GA meeting will be held tomorrow and on Monday. A copy of Holden's Inorganic Chemistry Division Committee Report to the ICTNS is attached to these Minutes as **Appendix 4**

### **14 - Reports on recent, planned and proposed Division-sponsored conferences High Temperature Materials Conference (HTMC-XIII)**

This triennial Conference was last held on 14-18 September 2009 in Davis, California and a report on that meeting was included in the Minutes of the Glasgow Division meeting. A copy of the report is available for downloading from the HTMC webpage: [http://www.iupac.org/web/act/Davis\\_2009-09-14](http://www.iupac.org/web/act/Davis_2009-09-14). This was the 13th Conference in a series of triennial meetings, with the previous two held in 2003 in Tokyo (Japan) and in 2006 in Vienna (Austria). The next conference in this series, HTMC XI, is scheduled for 2012 in Beijing, China. Unlike in the past, there are currently no Division members who are associated with this Conference.

### **Workshop on Advanced Materials (WAM)**

The last WAM (WAM III) was held in Stellenbosch, South Africa in 2005, and WAM IV was originally planned for 2008; however, these plans fell through and Mathur had agreed to try to revive this series and find an alternative location and conference organizer. Subsequent efforts to revive this series and to find a suitable organizer and location were undertaken by the Interdivisional Subcommittee on Materials Chemistry, but have thus far proved unsuccessful.

The meeting was adjourned for the day at 5:45pm and continued the next morning (Saturday).

## **10 - Review of Division budget allocations and expenditures (Continued) (Loss)**

Loss, who was unable to attend the meeting after lunch yesterday, due to a medical problem, opened today's meeting with a continuation of item 10. He noted that prior to the GA, Division II had committed 77.5% of the \$55,200 that was budgeted, entirely on Projects (no funds were expended for Operations, as the Division did not hold an off-year meeting in 2010). This leaves \$12,400, some of which was to be spent on Operations in connection with the San Juan GA.

## **15- Report from Commission on Isotopic Abundances and Atomic Weights (CIAAW) and its Subcommittees (Loss)**

Loss reported on the recent Commission meeting in Calgary, Canada (July 27-28, 2011). A draft report on this meeting is attached as **Appendix 5**. The Commission spent considerable time on the ongoing Project on the Periodic Table of the Isotopes that was featured in an article published in Chemistry International as well as a separate pull-out (Vol. 33 No. 2 and Vol. 33 No. 4). This Table will play a key role in education and outreach to inform students that chemical elements are made up of stable isotopes and unstable isotopes, while displaying their properties and applications in everyday experiences.

Increased activity in the isotopic abundance community had necessitated the Subcommittee on Isotopic Abundance Measurements (SIAM) evaluating 82 peer-reviewed publications. Based on this, the Commission changed the standard atomic weights of 5 elements. These atomic weights will be included in a new Table of Standard Atomic Weights, which will be submitted for publication to PAC.

The Subcommittee for Natural Assessment of Fundamental Understanding (SNAFU) presented work being done to assist users in the use of the new atomic weight intervals and accompanying figures. The Commission recognized that education of the user community is essential for future understanding of the atomic weight intervals, which reflect the fact that atomic weights are not constants in Nature.

In response to a question, Loss noted that the Commission receives no direct support from IUPAC, instead relying mainly on Projects to support their meetings. When CIAAW have spent all of their Project funding and it is justified to the Treasurer, CIAAW can apply to the Division for support from the notional 30% of the Division budget which is recommended to be spent on Administrative costs.

## **16 - Project-by-project review of project status (Coplen, Loss)**

### Part I: Review of Funded Projects

Current Division II Budget

Total biennial allocation: USD 55,200

Operations (USD 1,834) & Commitments (USD 42,800) as of 1-Jan-11: USD 44,634

2009-025-1-200, Wieser/Meija,	USD 2,500
2009-026-2-200, Berglund	USD 6,000
2009-027-1-200, Brand,	USD 9,600
2009-029-1-200, Hirata,	USD 13,200
2009-045-1-200, Ishida	USD 8,000
2009-046-2-200, Kaiser	USD 1,500
2010-003-1-200, Öhrström	USD 2,000

**Project #2001-015-1-100, “Standard potentials of radicals”, D.M. Stanbury**

Joint with Division I, started Jan. 1, 2002; extended by a year from June 2008 to June 2009; extended again to Dec. 2010. \$21,000 (with Div I); Spent: \$20,525

Update requested 7-16-2011: “Progress on this IUPAC project has been slow this year, but I believe that we are nearing completion. The greatest challenge in the inorganic component of the Radical Potentials project has been assignment of the dioxygen/superoxide potential. Although this potential is reasonably well-known, assignment of a "best" value has been contentious within the Task Group. The value is derived from measurements of equilibrium constants of electron-transfer reactions with other "reference" redox couples. The problem is that the reference couples are not as reliable as has been widely believed. We have now assessed the reliability of the reference couples. Last month I traveled to Zurich to visit Wim Koppenol (a Task Group member), and we reviewed the data and arrived at a consensus. The next step will be to prepare a document regarding this consensus, circulate it to the other Task Group members and solicit their opinions. Hopefully all will be in agreement and we can proceed to preparation of the final reports.”

**Project #2001-019-1C-200, “Guidelines for mass spectrometric isotope ratio measurements”, T.R. Walczyk**

\$2,000 allocated and spent. This Project is now completed.

A publication entitled, “Guidelines and Recommended Terms for Expression of Stable isotope-ratio and Gas-ratio Measurement Results” is in press at *Rapid Communications in Mass Spectrometry*.

The report, “Explanatory Glossary of Terms Used in Expression of Relative Isotope Ratios and Gas Ratios”, was originally submitted by Coplen to PAC. This paper received 25 reviews, was revised based on 9 reviews, then again based on 2 reviews. However, it was ultimately not accepted due to the objections of R. Marquardt, Chair of the Commission on Physicochemical symbols, Terminology and Units, who did not like the notation used, which was standard usage in this field. It was therefore decided to publish it elsewhere (*Rapid Communications in Mass Spectrometry*).

**Project #2006-016-1-200, “Recommendations for Isotope Data in Geosciences”, P. Renne**



Joint with Analytical Division; 4,900 Allocated, 4,650 Spent; Planned Ending Date: 30-Jun-2011.

Comment: Object is to update and harmonize recommendations on half-lives and isotopic compositions

Publication: IUPAC-IUGS common definition and convention on the use of the year as a derived unit of time (IUPAC Recommendations 2011)", Pure Appl. Chem., Vol. 83, No. 5, pp. 1159-1162 (2011).

This was the subject of an Editorial in "New Scientist", Celeste Biever, 27 April 2011, entitled "The new definition of the year should be welcomed".

**Project #2006-025-1C-200; "Assessment of fundamental understanding of isotopic abundances and atomic weights of the chemical elements", N. Holden**

\$9,800 Allocated and spent; Project Completed

Comment: Object is to review fundamental issues and concerns that have been raised by members of the Commission on Isotopic Abundances and Atomic Weights.

**Project #2006-046-1-200; "Priority claims for the discovery of elements with atomic number greater than 111"; P.J. Karol**

\$10,220 Allocated, \$7,290 Spent; Planned Ending Date: 31-Dec-2011

Claims for the discovery of elements of atomic number greater than 112 have been invited and the scientists name below have submitted the following claims:

- Dr. Kosuke Morita, The Institute of Physical and Chemical Research, Riken, Japan; for element 113
- Dr. Sergey Dimitriev, Joint Institute for Nuclear Research, Dubna, Russia; for elements 113, 114, 115, 116, and 118

**Project #2007-028-1-200; "Evaluated Published Isotope Ratio Data (2007-2009)"; M. Berglund**

\$12,800 Allocated, \$12,835 Spent; Project Completed

Comment: Meeting in Vienna, Austria (2009): Data Evaluation contributing to Table of Isotopic Compositions of the Elements (TICE) and Table of Standard Atomic Weights of the Elements (TSAW).

Final Report Published:

Atomic weights of the elements 2009 (IUPAC Technical Report), by M.E. Wiener and T.B. Coplen; Pure Appl. Chem. **83**(2), 359-396 (2011)

Final Report for 2007-28C-1-200:

Isotopic compositions of the elements 2009 (IUPAC Technical Report), by M. Berglund and M.E. Wiener, Pure Appl. Chem. **83**(2), 397-410 (2011)

**Project #2007-029-1-200; “Evaluation of isotopic abundance variations in selected heavier elements”; X. Zhu**

\$12,800 Allocated, \$8,971 Spent; Planned Ending Date: 31-Dec-10

Comment: Meetings in Vienna, Austria (2009) and Calgary, Canada (2011). Data Evaluation Contributing to Table of Isotopic Compositions of the Elements (TICE) in 2009 and Table of Standard Atomic Weights of the Elements (TSAW) for TSAW 2011. An additional publication is planned during the next 12 months.

**Project #2007-031-1-200; “Evaluated Compilation of International Reference Materials for Isotope Abundance Measurements”; R. Schönberg**

\$13,750 Allocated; \$8,450 Spent; Planned Ending Date: 31-Dec-2010

Comment: Essentially completed.

**Project #2007-038-3-200; “Development of an Isotopic Periodic Table for the Educational Community” (joint with Committee on Chemical Education (CCE)); N. Holden**

\$11,000 Allocated, \$9,451 Spent; Planned Ending Date: 31-Dec-2010

Comment: Outstanding Progress

**Project #2007-040-2-200; “Analysis of the Usage of NanoScience and Technology in Chemistry” (with Division I); J. Garcia-Martinez and S. Mathur**

Joint with Division I; \$4,000 Allocated, \$0 Spent; Planned Ending Date: 31-Dec-2011

Report presented by Garcia

Objective: To map and critically study the use of the prefix nano in various fields of chemistry. For this purpose, we will use the different search engines available on the web to compare the usage of nano-containing terms. We will map the evolution and usage of nano-containing descriptive terms according to different criteria, and critically analyze their validity in scientific (chemical) language. This project is the first step towards recommendations on the use of chemistry terminology related to nanoscience and nanotechnology.

Description: The scope of this project is to study the use of "nano-" terminology in chemistry, analyzing its evolution with time, by country, and its penetration among various chemical disciplines. The aim of this project is not to make any formal definition or recommendation of the use of "nano-" in chemistry, but first to determine what is the current situation regarding the use of "nano-" in chemistry terminology through a detailed analysis of peer-reviewed papers, patents, and books. This project will deliver a guideline for IUPAC to assess the use of "nano-" in chemistry as a first step in proposing recommendations and suggested terminology.

The methodology proposed is the following. First, we will use widely available and popular chemistry search engines, such as Sci Finder, and others provided by the CAS and RSC. The hits on "nano\*" will be analyzed according to criteria, such as time, country, and source. Secondly, we will repeat the process by restricting the search to some of the

most highly cited journals of each chemistry discipline, to learn if "nano-" terminology has impacted all the areas of chemistry and if so, to what extent and at what rate.

Some conclusions:

- The share of nanotechnology papers in chemistry journals has more than doubled over the past ten years from 12% in 1996-7 to 26% in 2006-7
- Nanotechnology papers account for more than 50% of all articles and reviews in a journal, such as *Chemistry of Materials*, 40% or more in journals, such as *Macromolecules* and *Journal of Physical Chemistry*.
- General journals have a 'balanced' number of nanotechnology related papers close to the average value of above 20%
- Chemical engineering seems to be apart from other traditional fields a specialty to which nanotechnology is not as important as in other cases
- Education in chemistry is another, perhaps not very surprising area of low nanotechnology coverage

J. Garcia-Martinez and S. Mathur are writing an article summarizing the aims, methodology and main findings of this project to be submitted in the coming months to Chemistry International.

**Project #2008-006-3-100; "Critical evaluation of thermodynamic properties of hydrogen storage materials: metal organic frameworks and metal or complex hydrides"; L-X. Sun**

Joint with Divisions I and III; \$15,000 Allocated (\$1,000 from Div II), \$1,800 Spent; Planned Ending Date: 30-Sep-2012

Report from Sun: We have established a comprehensive bibliography, which has about 300 entries. Studies on synthesis and hydrogen storage properties of metal organic frameworks, metal hydrides, and complex hydrides have been compiled and evaluated. In our group, we have studied hydrogen storage capacity and thermophysical properties of complex hydrides and metal organic frameworks. In 2011, we have published five journal papers acknowledging Grant No. 2008-006-3-100.

**Project #2008-040-1-200; "Towards a comprehensive definition of oxidation state"; Karen**

Allocated: \$4,200; Spent: \$0; Planned Ending Date: 1-Mar-2011

Report from Karen:

All 95 oxidation state examples have now been debated with the aid of PowerPoint presentations by all three working members of the task group. Among other approaches, we have used crystal structural data and bond-valence approach as well as quantum mechanical calculations by extended Hückel method, by Hartree-Fock and DFT methods.

We have arrived at a generic definition of the oxidation state and several algorithms to deduce the numerical value of this parameter. The extensive collection of individual case studies illustrates how the oxidation state behaves with respect to various types of

chemical formulas, such as the summary formula, a simple Lewis formula, a bond-order formula, etc.

The case studies show various aspects of this parameter, among other reveal a few cases of an ambiguous oxidation state or one that is practically indeterminable.

Having just finished the analytical part of the task, the rest will be “synthetic”, so to speak. We’ll devote the next 6 months to the write-up as a means to produce consistency. Given the extent of data we feel should be treated, we reevaluated the originally intended channels of publication. A relatively extensive report that comprehensively covers the properties of oxidation state appears the best way forward, instead of the originally intended, yet necessarily shorter, Recommendation. Only subsequently this report will be condensed into a shorter overview. As planned, we intend to write a publication devoted to oxidation state in teaching inorganic chemistry.

We consider producing the following documents, in the said order:

Technical Report (estimated 45 pages of manuscript)

Recommendation (less than 10 pages of manuscript)

Suggestion for the Gold book website

A manuscript for J. Chem. Educ.

As indicated, the write-up of the Technical Report is a component of improving and quality-auditing our results. We still have to decide about a possible meeting. We expect to conclude this project within its extended duration (to March 1, 2012)

**Project #2009-012-2-200; “Coordination polymers and metal organic frameworks: terminology and nomenclature guidelines; Öhrström**

Allocated \$11,500; Spent: \$2,812; Planned Ending Date: 31-Dec-2011, Estimated End Date: 30-June-2012.

Comment: Oral report given by Öhrström

**Objective:** The objectives of this project are (1) to produce guidelines for terminology (glossary of terms) and nomenclature (concerning topology, not naming of individual substances) in the area of coordination polymers, (2) to ensure that these guidelines are accepted by a large group of leading researchers in the field, and (3) to have these guidelines implemented or referred to in the instructions to authors of leading general and inorganic chemistry journals.

**Progress:** *Aug 2009* - The task group held its first meeting during the GA in Glasgow early August; *Jan 2010* - project announcement published in [Chem. Int.](#) Vol. 32 No. 1. Reedijk presented the task group’s progress at the Div. VIII meeting in Lund 2010.

One of the tasks the group set itself was to engage in discussions with the scientific community. To this effect we have held to two discussion seminars in Nottingham and Kyoto, and the web has been used to gather information from about 100 scientists in the area via mostly announcements on the ACS network, Dalton and CrystEngComm blogs, the projects IUPAC page and MOF interest group on LinkedIn.

We are currently preparing a draft "discussion" manuscript to be submitted to CrystEngComm.

Overall, the answers to the survey question: "do you approve of the term 'coordination network solid'" as a definition of Metal Organic Frameworks (MOFs) were in favor (55 'yes' and 30 'no), but with a significant number disagreeing, especially among the general responses received.

Some major points of disagreement have emerged; the most fundamental concerning the use of the term "polymer".

It is not clear if compounds commonly referred to as "MOF's" or "coordination polymers" are polymers at all, according to the IUPAC definition (which relies on the concepts "relatively high molecular weight" and "macromolecule"). On the other hand, the physical properties we usually associate with polymers have no place in this definition.

Discussions are continuing within the Task Group regarding the results of the survey and how to resolve differences within the community and perceived or real inconsistencies with the current IUPAC definitions.

**Project #2009-023-1-200; "Evaluation of Radiogenic Abundance Variations in Selected Elements"; Wieser**

Allocated: \$8,500; Spent: \$3,340; Planned Ending Date: 31-Dec-2012

Comment: Two of the original task members have passed away: John de Laeter and Etienne Roth. Only the Chair and 1 member are living. A one-year no cost extension was requested & approved.

**Project #2009-025-1-200; "Technical Guidelines for Isotope Abundances and Atomic Weight Measurements"; Meija**

Allocated: \$2,500; Spent: \$1,500; Planned Ending Date: 30-Jun-2011. Members met in Calgary (July 2011) and are planning a publication.

**Project #2009-026-2-200; "Online evaluated isotope ratio database for user communities (2011-2014)"; Berglund**

Allocated: \$6,000; Spent: \$0; Planned Ending Date: 1-Apr-2014

Comment: Recently funded. Members will likely meet in November 2011.

**Project #2009-027-1-200; "Assessment of Stable Isotopic Reference and Inter-Comparison Materials"; Brand**

Allocated: \$9,600; Spent: \$3,530; Planned Ending Date: 31-Dec-2011

Comment: Recently funded. 30-page draft manuscript prepared and provided to task group members in July 2011.

**Project #2009-029-1-200; "Evaluated Published Isotope Ratio Data (2010-2011)"; Hirata**

Allocated: \$13,200; Spent: \$4,740; Planned Ending Date: 31-Dec-2011  
Comment: Project members met in Calgary in July 2011

**Project #2009-045-1-200; “Guidelines for Measurement of Luminescence Spectra and Quantum Yields of Inorganic Compounds, Metal Complexes and Materials”;  
Ishida**

Allocated: \$8,000; Spent: \$0; Planned Ending Date: 31-Dec-2011  
Comment: Recently funded

**Objective:**

This project aims to prepare a document describing guidelines for accurate measurements of luminescence spectra and quantum yields of metal complexes, inorganic compounds and materials. The document will disseminate basic knowledge, rules and protocols, not only to experts, but also to those new to this field.

K. Sakai gave a report on this Project on behalf of Dr. Hitoshi Ishida of Kitasato University in Japan, the Project Chairman.

What is the focus here?

- Photochemistry of Inorganic Materials
- Luminescence of Metal Complexes

What kind of Applications?

- Solar Energy Conversion and Storage; e.g., Solar Cells, Solar Fuels, etc.
- EL and ECL Materials; e.g., flat panel displays, etc.
- ➔ Technical problems depending upon the experimental method employed (what is the reliability of the reported data??)

Errors found due to technological advancements

- Absolute method for the quantum yield determination.
- ➔ realization of some errors in the reported data (STDs), which have been often used and cited by many researchers.

Fundamental Problems

- Inappropriate selection of standard materials; e.g.,  $[\text{Ru}(\text{bpy})_3]^{2+}$  (often used but highly temperature dependent quantum yield) (inappropriate value reported in the earlier works, which have been corrected recently)
- Inappropriate method used in the measurements
- Inappropriate methodology employed in the luminescence quantum yield determination
- etc.

End goal

Write guidelines for accurate measurements of luminescence spectra and quantum yields of metal complexes, inorganic compounds and materials in a form publishable as a IUPAC technical report.

It is not to determine what one must use as a standard for each case.

Approach Step 1:

Preparation of a draft of the guidelines by a core group of task members: Dr. Ishida, Dr. Beeby, Prof. Bunzli (three experts in this field).

Step 2:

Circulate a draft to the entire task group and evaluate the validity of the guidelines.

Step 3:

Revise until agreement can be realized.

Step 4:

Hold a meeting of the Task Group at an international photochemistry conference for finalization of the guidelines.

Step 5:

Publish technical report in PAC.

Step 6:

Translate the report into the language of each country to deliver the information within the country.

Step 7:

Hold a workshop at an international photochemistry conference, like ISPPCC (International Symposium on the Photochemistry and Photophysics of Coordination Compounds) to present and discuss the guidelines.

Additional Comments:

There are other groups attempting to make rules regarding the standards for the luminescence quantum yield determinations. Exchange of information with such related activities may be needed. Such issues will also be included in the discussion in this project.

Establishment of standard methods for accurate measurements of luminescence spectra and quantum yields will be the final goal but this project simply ends up by establishing the GUIDELINES ONLY. Establishment of a certain definite methodology for these measurements will be the next target of a future project.

**Project #2009-046-2-200; “Terminology and definition of quantities related to the isotope distribution in elements with more than two stable isotopes”; Kaiser**

Allocated: \$6,000; Spent: \$0; Planned Ending Date: 30-Jun-2012

Comment: Task group met in June. Extensive discussions were conducted via email. The problem is going to be encountered when members attempt to publish isotope notation/equations in PAC.

**Part II: Review of Project Proposals**

Although Division II currently has about USD 11,000 available for projects, no project proposals can be funded immediately. Three project proposals submitted in 2009 can be modified (improved) and sent back out for review by the Secretariat. A number of projects submitted within the last month need to be considered by Division II to see if they merit possible funding

**Proposals submitted**

**Project #2009-028-1; “Compilation and evaluation of isotopic fractionation factors for environmental investigations”; Ding**

Submitted in 2009; \$6,000 for 3 yr

Objective: Values of isotopic fractionation factors for reactions and processes of interest for environmental investigations will be reviewed and evaluated. The isotopic fractionations for which there are no values available in the scientific literature will be identified. Special attention will be given to elements such as hydrogen, boron, carbon, nitrogen, oxygen and sulfur for which isotope techniques are more useful and are most frequently applied.

The Secretariat received no reviews on this project proposal. The project proposal may need to be rewritten. It certainly needs a revised list of potential reviewers.

**Project #2009-030-1; “Recommendations for Isotope Data in Geosciences”; Renne**

Submitted in 2009; \$4,900 plus 4,900 from IUGS (International Union of Geological Sciences) for 3 yr.

Objective: Update & harmonize recommendations on half-lives & isotopic compositions. IUGS-IUPAC interaction will be tightened. Phase II (2010-2011) focuses on 7 nuclides used in geochronology ( $^{40}\text{K}$ ,  $^{87}\text{Rb}$ ,  $^{138}\text{La}$ ,  $^{147}\text{Sm}$ ,  $^{176}\text{Lu}$ ,  $^{187}\text{Re}$ ,  $^{232}\text{Th}$ ).

Status: Proposal needs to be resubmitted according to Dr. Fabienne Meyers

Comment: Strongly recommend that another person be selected as Chair

**Project #2009-024-1; “Reanalysis of uncertainty of atomic masses for the atomic weights of mono-nuclidic elements”, Holden**

Submitted in 2009; \$2,500 for 3 yr.

Objective: Reassess the standard procedure on the uncertainty of the atomic masses for 21 elements with a single stable nuclide for determining the uncertainty of the atomic weight for these mono-nuclidic elements. The atomic weights commission has used a procedure for the past 35 years recommended by the proposed chairman of the atomic mass evaluation (AME) table. The procedure is now considered to be too conservative by more than an order of magnitude in deriving the uncertainty for the atomic weight of elements with one stable isotope.

Of the two task group members, de Laeter, has passed away.

One review deemed the project not suitable for funding.

Project needs to be rewritten to improve justification for proposed work.

The Division needs to review project proposals submitted within the last month to decide which should go to the Secretariat for review and possible funding



### **III. Ideas for possible new Projects:**

Reedijk noted that he has frequently encountered errors in the online encyclopedia, Wikipedia, relating to inorganic chemistry and inorganic nomenclature in particular. Given the wide use of Wikipedia among students and the general public, it is important to insure that the information presented is consistent with IUPAC accepted definitions and terminology. A Project designed to search for such errors and submit corrections might be worth pursuing.

Interrante noted that C. Ober would be submitting a Project proposal on behalf of the ISMC for the development of a website for Materials Chemistry Education.

Rabinovich suggested a Project to create an interactive Periodic Table on biological connections/relevance/applications of the elements in both Spanish and English. Some discussion followed in which it was noted that several interactive websites are already available relating to the elements and their properties and uses, including the role of elements in life processes. This would have to be researched more thoroughly before considering a Project proposal in this area.

Öhrström presented an idea for a Project involving the critical evaluation of solution and structural inorganic data relevant for the uptake from foodstuffs of essential elements such as Fe, Zn, Mn, I, etc.

Bioinorganic chemists investigate the roles of metal ions once they enter the biological system, but the step from food to actual uptake by the body seems to be mainly explored by food scientists. While the latter are, of course, very competent and perform highly sophisticated experiments, they rely on basic inorganic data for some of their interpretations. The purpose of such a project would be to collect and evaluate solution and structural data for metal containing species possibly forming during this process, both by interaction with compounds naturally present in the body, and by interactions with other components of the food ingested, and present them in a way easily accessible for food scientists and other potential interest groups.

A first essential step prior to a project would be to investigate if the presumptions above are really true, as they are now based on limited data.

### **17 - Other Business – Appointment of Division representatives**

Dan Rabinovich will take over from Ty Coplen as the Division Project Coordinator.

### **Welcome package for new members**

Javier Garcia has updated the Welcome package for new members. Reedijk will insure that it gets to the newly elected Division members (Action item).

### **Discussion of possible dates for the 2012 Division off-year meeting**

It was decided to accept the invitation of S. Mathur to hold the 2012 Division off-year meeting at the University of Cologne in Germany. Mathur suggested that the 2012 meeting of the Interdivisional Subcommittee on Materials Chemistry be held immediately before the Division II meeting, also in Cologne. Interrante noted that this would have to be discussed with the new Chair of the Subdivision, Chris Ober of Division IV, who may have other plans for the 2012 ISMC meeting. The best time for the Division meeting seems to be early September. The actual dates will be set as soon as possible after the GA, based on further discussions between Mathur and the Division officers (Action item).

The Division meeting was adjourned at 4:35pm with a thank you and a round of applause to Coplen and Interrante for their years of service to the Division.

## **Appendix 1**

### **ACTION ITEMS    SAN JUAN    August 2011**

1. Bob Loss will present information on project generation at the next off-year meeting.
2. Len Interrante will write to the organizer of the young observer program that young observers need information about generating projects.
3. All should contribute to the Division II Newsletter by August 15 including sending pictures to Jan Reedijk.
4. All need to distribute the Newsletter.
5. Naming of new elements needs to come back to the Chair of Division II.
6. Ty Coplen will contact Division V to see if Division V will contribute to the molybdenum project proposal.
7. All are encouraged to submit project proposals as soon as possible, preferably before September 1.
8. Reedijk will distribute the Welcome Package to the new Division members.
9. Mathur will provide information, as soon as possible, on the place and date of the 2012 Division meeting after discussion with the Division Officers.

## Appendix 2

### IUPAC: INORGANIC CHEMISTRY DIVISION (II) Report to Warsaw Bureau Meeting – April 2011

#### 1. Members (2010-2011)

**President:** R. D. Loss (Australia), **Past President :** K. Tatsumi (Japan)

**Vice President:** J. Reedijk (The Netherlands), **Secretary:** L. V. Interrante (USA)

**TM:** T. Ding (China), J. Garcia Martinez (Spain), N. Holden (USA), P. Karen (Norway), S. Mathur (Germany), K. Sakai (Japan),

**AM:** T. Basova (Russia), T. Coplen (USA), L-K Liu (China/Taiwan), M Drabik (Slovakia), M. Leskela (Finland), L. Öhrström (Sweden)

**NR:** A. V. Chadwick (UK)A. Bologna Alles (Uruguay), V. Chandrasakehar (India), T. Dasgupta (Jamaica). YL. Yoong Goh (Singapore), R. Gonfiantini (Italy), A. Kiliç, (Turkey), T. H. Tarafder (Bangladesh), N. Trendafilova (Bulgaria), K. Yoon (Korea).

#### 2. Commission and Subcommittees

- \* Commission on Isotopic Abundances and Atomic Weights (II.1), Chairman: W. Brand
- \* Subcommittee on Isotopic Abundance Measurements, Chairman Hirata Takafumi
- \* Subcommittee on Stable Isotope Reference Material Assessment, Chairman W. Brand
- \* Interdivisional Subcommittee on Materials Chemistry, Chairman: L. V. Interrante

#### 3. Operations

1) Division II covers the following three areas in general “Inorganic Chemistry”.

1-1) *Atom: Isotopic Abundances and Atomic Weights:*

The “Atom” members in our Division have continued to be active and productive both inside and outside of IUPAC. These members are closely association with the Commission on Isotopic Abundances and Atomic Weights, and the Subcommittee on Isotopic Abundance Measurements, and most are involved in current and proposed projects. The Commission’s primary role is to publish evaluated isotopic compositions of the elements and their atomic weights. Steady improvements in isotopic measurement technologies and techniques have resulted in increasing numbers of publications of higher resolution isotopic composition data. A major outcome of these developments and a number of subsequent evaluations was that at the 2009 Vienna meeting of the Commission it was recommended that the next officially published Table of Standard Atomic Weights (TSAW) would use ranges rather than uncertainties. The latest Atomic Weights of the Elements (2009) was published on line December 12 2010, and subsequently in PAC (Berglund and Wieser PAC 83[2] 397-410) on January 14 2011 . This Technical Report, and in particular the non-constancy issue of a number of atomic weights, attracted significant media and on line attention and was reported in many major hard copy and

online newspapers and websites. At the height of interest the non-constancy of atomic weights aspect was being simultaneously reported as a “Period Table Make-over” across more than 400 unique websites globally, creating valuable publicity for IUPAC and the IYC.

An accompanying publication by Tyler Coplen and Norman Holden on "Atomic Weights no longer constants of nature"; was published in the *Chemistry International*, 33(2) page 10, March-April issue, (March 2011). Norman Holden is also involved in a publication on the "Recommendation for a Common Definition and Use of the Year as a Derived Unit of Time (IUPAC-IUGS Recommendation 2009)"; scheduled for publication in the May 2011 issue of *Pure Applied Chemistry*. This is the work of the Joint Union Task Group Project, International Union of Geological Sciences (IUGS) and IUPAC. Norman has also published "A Weighty Change to the Periodic Table"; in February 2011 on *ScienceBlogs/Brookhaven bits&bytes*, <http://bit.lyfQivSG>

The A web-site for the interactive IUPAC Periodic Table of the Isotopes has been constructed at the National Nuclear Data Center, Brookhaven National Laboratory for use in the pilot study of educational materials on isotopes for the educational community. Significant input to the data-base by Dr Holden is acknowledged.

In August of 2010, one of the CIAAW most senior members, Prof John deLaeter, passed away. John had been involved with the Commission since the 1970's and served as secretary and Chairman in the 1980's and then for many years as National Representative. John also published many papers on the atomic weights, including those of Sn, Ba, Cd, Ta, Lu, Yb, Mo, Sb, and Te, and led the publication of the Major PAC report, “Atomic Weights of the elements: Review 2000”

*1-2) Molecular Inorganic Chemistry:*

The majority of Division members belong to the “molecules” area, including coordination chemistry, organometallic chemistry, bioinorganic chemistry, transition metal catalysis, etc. VP Reedijk has been selected as the IUPAC lecturer for the proposed Eurasia12 on the Chemical Science Conference to be held in Corfu in April of 2012. The conference is targeting Chemistry in Scientifically Emerging regions of the Middle East and Asia.

*1-3) Solid State Inorganic and Materials Chemistry:*

The members of this group are associated with the activity of Subcommittee on Materials Chemistry, and with contribution from Solid State High-temperature Materials Chemistry. The Subcommittee on Materials Chemistry is exploring together with Divisions I and IV ways of expanding the significance of Materials Chemistry with IUPAC and increasing the interaction between IUPAC and the Materials Chemistry user communities. A proposed meeting to be held in Geneva in April 2011 was cancelled due to the Icelandic Volcano's effect on air travel at the time. This meeting was held at the American Chemical Society meeting in Boston in late 2010.

IUPAC technical report “Towards definition of materials chemistry“ has been translated by TM Milan Drabik to Slovakian, 2 parts published in *ChemZi* – bulletin of Slovak

chemical society. It is recommended to Slovak chemists to apply and use that definition as widely as possible.

The Slovak Chemical Society and Slovak local focal point (Lukas Krivosudsky, Milan Drabik), have promoted the initiative of the global chemistry experiment, "Water: a chemical solution". The "white paper", brief information leaflet and the complete texts associated with the experiment have been translated and circulated to Slovak science teachers and students. Based on the preliminary responses the Society anticipates a wide participation in the experiment, the highlight of which will occur during the Chemistry Slovakia 2011 fair (April 12th – 14th 2011, Web: <http://www.incheba.sk/exhibitions/3625?lang=en>), and the Night of researcher 2011 (usually the last Friday of September of each year).

#### 4) State of Projects - March 2011

As of mid March 2011, the Division has 18 (down from 22 in 2010) projects on its project list. Two of these are effectively completed, leaving 16 active projects 4 of which are over time. Three proposed projects are in the pipeline and 1 is pending a final decision.

2009-024-1 Holden USD 2500

Reanalysis of uncertainty of atomic masses for the atomic weights of mono-nuclidic elements  
One reviewer recommended a revision but Dr Holden has not yet revised it, as he is too busy with the IUPAC Periodic Table of the Isotopes project.

2009-028-1 Ding USD 6000

Compilation and evaluation of isotopic fractionation factors for environmental investigations  
FM is still seeking possible reviewers for this project.

2009-030-1 Renne USD 4900 from IUPAC and 4900 from IUGS

Recommendations for Isotope Data in Geosciences (extension of project 2006-016-1-200)  
This project is being held up, awaiting completion of project 2006-016-1-200.

#### 5. Other Activities

- *Validation of the claims for, and naming of, new elements: (from Sean Corish)*

The report on elements with Atomic Number > 112 was submitted and sent to the laboratories for their comments on technical accuracy. The Report has since been revised by the authors and resubmitted. This is currently with expert referees and if approved for publication will be published and sent to the ECs of both IUPAC and IUPAP for approval. After that if there are any elements to which priority for their discovery is assigned the laboratories concerned will be asked to propose names, Division II will be asked to approve names after which the usual provisional recommendation will be issued and time period allowed to elapse for comment. It is possible that the process could be completed by the end of year but the process, for obvious reasons, cannot be rushed. In the opinion of the experts it is now worthwhile setting up a new Joint Working Group and our Executive Director has met with his counterpart in IUPAP to get this underway. In so far as is known, panels from which the new JWG will be chosen by the Presidents of the Unions are now in place. There are also now claims for element 117 which will be considered

as well as any unassigned from 113, 114, 115, 116 and 118.

- *Division Newsletter*: The Inorganic Division Newsletter continues to be produced with two editions (May and December 2010) being produced since the last Bureau meeting. VP Reedijk continues as editor and has been doing an excellent job and it continues to be picked up for subsequent redistribution by several National Chemical Societies.

- *IYC – 2011*:

A number of Div II members have been involved in ICY activities

VP Jan Reedijk

Jan attended the opening of IYC for the Netherlands on January 27. The opening was attended by a Government minister and a CEO of AKZO-Nobel, the chair of the research council (NWO), and the President of the academy of sciences. The Dutch IYC site

<http://www.jaarvandechemie.nl/nieuws-en-verslagen/artikelen/minister-verhagen-luidt-themajaar-chemie-in> is listing many activities and events for the

AM: Markku Leskelä

Is chairing the Finish IYC organizing committee, which has wide representation from Finnish chemical industry, science museums, teachers association, university, ministry of education etc, overseen by the Association of Finnish Chemical Societies. The organization committee started work in September 2009, with was already busy in planning and finding of sponsors. They have huge number of activities all over in Finland divided according to target audiences: eg public, schools professionals and media. There are 23 companies and 3 foundations as sponsors. Markku reports considerable success with the media group where professional people such as public relation managers from companies, radio reporters etc, have made a special programs covering 6 IYC events specifically for journalists. There are plans to involve radio and TV. Details of the activities are available at (<http://www.kemia2011.fi/>) commencing with the grand opening in Jan. 13, and have had several local events and events to activate teachers. The major event is a Chemical Congress and the ChemBio exhibition in March 22-24. In May 12, we have reserved the central square in Helsinki for a one-day event for public, which will include activities such as games, and the chemistry of barbecue.

P Bob Loss

Attended an IYC Women into Chemistry breakfast at the Western Australian Technology Park. This worldwide event was held the day before the official IYC opening and involved a video linking of venues around the world.

TM Lars Öhrström

Has participated in the conception and preparation of the material "Periodic Table of the Movie Stars" for the western Sweden IYC activities.

TM Milan Drabik

Has been involved with the production and dissemination of Info leaflet with the summary of IYC related activities in Slovakia (available on request).

Attended the official launch ceremony (January 17th) of Slovak postage stamp commemorating the IYC (activity of issuing the stamp is listed also in the IYC web site). Milan also participated in the official IYC Launch ceremony in Paris.

## **6. Significant Issues**

The following issue relating to isotopic terminology was reported on at last years Bureau meeting and has still not been resolved. Briefly there is a major difference between isotopic terminology in the Green Book and that required by ICTNS, and that in widespread use for many decades by isotopic user communities.

This issue arose in 2009 following the submission to PAC of a technical report by Ty Coplen containing recommendations for isotope ratio expressions. This report has been the subject of many reviews and revisions. The latest version entitled, "Guidelines and Recommended Terms for Expression of Stable Isotope-ratio and Gas-ratio Measurement Results" has been approved by CIAAW and will be discussed at the upcoming CIAAW meeting in Calgary in July of this year.

There has been some correspondence between myself and the CIAAW chair (Brand), and Div 1 Secretary (Marquardt) on this matter. Following a long delay (6 months) in response time secretary Marquardt promised to make some minor changes to the Green book in the future, but referred key difference back to ICTNS. There has been no offer of involvement of CIAAW with the proposed revisions.

To quote CIAAW Chairman Brand, "I do not know how to proceed from here. I cannot convince ICTNS to change their mind, and neither do I want to be the one to try to convince the isotope world that a change in terminology is required. In fact, I believe that the stable isotope community will continue to ignore IUPAC."



## Appendix 3

## Inorganic Chemistry Division Committee 2012-2013

Name	Proposed Status	Proposed Term	NAO
Prof. Robert D. Loss	TM - President	2010-2013	Australia
Prof. Jan Reedijk	TM – Vice President	2012-2013	Netherlands
Prof. Markku Leskelä	TM - Secretary	2012-2015	Finland
Dr. Milan Drábik	TM	2012-2013	Slovakia
Dr. Norman E. Holden	TM	2010-2013	United States
Prof. Pavel Karen	TM	2010-2013	Norway
Prof. Lars R. Öhrström	TM	2012-2013	Sweden
Prof. Sanjay Mathur	TM	2010-2013	Germany
Prof. Ken Sakai	TM	2010-2013	Japan
Dr. Edit Tsuva	TM	2012-2013	Israel
Dr. Joseph Buchweishajja	AM	2012-2013	Tanzania
Dr. Tiping Ding	AM	2012-2013	China/Beijing
Dr. Javier Garcia-Martinez	AM	2012-2013	Spain
Prof. Adem Kiliç	AM	2012-2013	Turkey
Prof. Daniel Rabinovich	AM	2012-2013	United States
Dr. Rose-Noelle Vannier	AM	2012-2013	France
Prof. Dr. Yang Farina Abdul Aziz	NR	2012-2013	Malaysia
Prof. V. Chandrasekhar	NR	2012-2013	India
Dr. Biserka Prugovečki	NR	2012-2013	Croatia
Prof. Natasha Trendafilova	NR	2012-2013	Bulgaria
Prof. Henrique E. Toma	NR	2012-2013	Brazil
Prof. Sujittra Youngme	NR	2012-2013	Thailand
	10 TMs, 6 AMs, 6 NRs		

AM = Associate Member

NR = National Representative

TM = Titular Member

## Appendix 4

### Inorganic Chemistry Division Committee Report to the ICTNS

Norman E. Holden

#### INTRODUCTION

This report provides the status (as requested<sup>1</sup>) on the various projects of the Inorganic Chemistry Division Committee (Division II) to the Interdivisional Committee on Terminology, Nomenclature and Symbols (ICTNS) of the International Union of Pure and Applied Chemistry (IUPAC) for consideration during the ICTNS meeting at the 46<sup>th</sup> IUPAC General Assembly (GA) in San Juan, Puerto Rico on July 31<sup>st</sup> and August 1<sup>st</sup> 2011.

This report will provide an update to the information previously provided to ICTNS following the 2009 meeting of Division II at the 45<sup>th</sup> IUPAC GA in Glasgow, Scotland. Normally, Division II holds an off-year Division Committee meeting in the time period between the GA meetings of the Division Committee. In light of recent Division budget constraints, the planned 2010 Division Committee meeting was officially eliminated<sup>2</sup>. The first meeting of the Division Committee, since Glasgow, will occur on July 29<sup>th</sup> and 30<sup>th</sup> 2011 at the San Juan IUPAC GA.

It should also be noted that within Division II, the representative to the ICTNS and the Divisional Project Coordinator are two separate positions and are held by two separate individuals. My knowledge of the present status of each Division Project is restricted to information provided by the Divisional Project Coordinator at the Division Committee meetings (last meeting in Glasgow) and information that is publically available.

#### DIVISION'S PROJECT STATUS REPORT – JUNE 2010

Project: 2006-046

Title: Priority claims for the discovery of elements with atomic number greater than 111.

Status: Two articles have been published.

“Name and symbol of the element with atomic number 112 (IUPAC Recommendation 2010)”, Kazuyuki Tatsumi and John Corish, *Pure Applied Chemistry* 82 (3) pp. 753-755 (2010);

And

“Discovery of elements with atomic numbers greater than or equal to 113 (IUPAC Technical Report)”, Robert C. Barber, Paul J. Karol, Hiromichi Nakahara, Emanuele Vardaci and Erich Vogt, *Pure Applied Chemistry* 83 (7) pp. 1485-1498 (2011).

Project: 2006-016

Name: Recommendations for isotope data in geosciences.

Status: One article has been published.

“IUPAC-IUGS common definition and convention on the use of the year as a derived unit of time (IUPAC Recommendations 2011)”, Norman E. Holden, Mauro L Bonardi, Paul De Bievre, Paul R. Renne and Igor M. Villa, *Pure Applied Chemistry* 83 (5) pp. 1159-1162 (2011).

Project: 2007-031

Title: Evaluated compilation of international reference materials for isotope abundance measurements.

Status: Report anticipated to be presented at the meeting of the Commission on Isotopic Abundances and Atomic Weights (CIAAW) in Calgary, Canada on July 27<sup>th</sup> 2011.

Project: 2007-040

Title: Analysis of the usage of nanoscience and technology in chemistry.

Status: Report anticipated to be presented at the meeting of the Inorganic Chemistry Division (Division II) in San Juan, Puerto Rico on July 30<sup>th</sup> 2011.

Project: 2007-038

Title: Development of an isotopic periodic table for the educational community.

Status: One article has been published.

“IUPAC periodic table of the isotopes”, N.E. Holden, T.B. Coplen, J.K. Bohlke, M.E. Wieser, G. Singleton, T. Walczyk, S. Yoneda, P. Mahaffy and L.V. Tarbox, *Chemistry International* 33 (4) supplement (July-August 2011).

Project: 2007-029

Title: Evaluation of isotopic abundance variations in selected heavier elements.

Status: Report anticipated to be presented at the meeting of CIAAW in Calgary, Canada on July 27<sup>th</sup> 2011.

Project 2008-040

Title: Towards a comprehensive definition of oxidation state.

Status: Report anticipated to be presented at the meeting of Division II in San Juan, Puerto Rico on July 30<sup>th</sup> 2011.

Project: 2009-012

Title: Coordination polymers and metal organic frameworks: terminology and nomenclature guidelines.

Status: Report anticipated to be presented at the meeting of Division II in San Juan, Puerto Rico on July 30<sup>th</sup> 2011.

Project: 2009-023

Title: Evaluation of radiogenic abundance variations in selected elements.

Status: Report anticipated to be presented at the meeting of CIAAW in Calgary, Canada on July 27<sup>th</sup> 2011.

Project: 2009-025

Title: Technical guidelines for isotope abundances and atomic weight measurements.

Status: Report anticipated to be presented at the meeting of CIAAW in Calgary, Canada on July 27<sup>th</sup> 2011.

Project: 2009-027

Title: Assessment of stable isotopic reference and inter-comparison materials.

Status: Report anticipated to be presented at the meeting of CIAAW in Calgary, Canada on July 27<sup>th</sup> 2011.

Project: 2009-029

Title: Evaluated Published isotope ratio data (2010-2011).

Status: Report anticipated to be presented at the meeting of CIAAW in Calgary, Canada on July 27<sup>th</sup> 2011.

Project: 2009-045

Title: Guidelines for measurement of luminescence spectra and quantum yields of inorganic compounds, metal complexes and materials.

Status: Report anticipated to be presented at the meeting of Division II in San Juan, Puerto Rico on July 30<sup>th</sup> 2011.

Project 2009-046

Title: Terminology and definition of quantities related to the isotope distribution in elements with more than two stable isotopes.

Status: Report anticipated to be presented at the meeting of CIAAW in Calgary, Canada on July 27<sup>th</sup> 2011.

Project 2009-026

Title: Online evaluated isotope ratio database for user communities (2011-2014).

Status: Report anticipated to be presented at the meeting of CIAAW in Calgary, Canada on July 27<sup>th</sup> 2011.

#### DISCUSSION

Since the majority of any new information on these various open projects will only become available during the week of (or even just during the day before) the ICTNS meeting, I will plan on providing a verbal update on these open projects during the sessions of the ICTNS meetings at the San Juan General Assembly.

#### REFERENCES

1. Prof. Dr. Bernardo Jerosch Herold, e-mail, June 12, 2011, "ICTNS meeting San Juan".
2. Prof. Jan Reedijk, Inorganic Chemistry Division (II) Newsletter 2010-1.

## Appendix 5

### **Draft report for the Inorganic Division Commission Isotope Abundances & Atomic Weights (CIAAW) Report for 2010-2011**

The Titular and Associate members, National Representatives and Observers present at the Commission on Isotope Abundances and Atomic Weights Meeting in Calgary were: W. Brand (Chair, Germany), M. Wieser (Secretary, Canada), M. Berglund (Belgium), M. Gröning (Austria), T. Walczyk (Singapore), T. Prohaska (Austria), S. Yoneda (Japan), N. Holden (USA), R. Schönberg (Norway), X. Zhu (China), P. De Bièvre (Belgium), J.K. Böhlke (USA), T.B. Coplen (USA), T. Ding (China), R. Loss (Australia), J. Meija (Canada), G. Singleton (USA)

The Commission on Isotopic Abundances and Atomic Weights met at the University of Calgary in Calgary, Alberta, Canada from the 27<sup>th</sup> to the 28<sup>th</sup> of July 2011 under the chairmanship of Dr. Willi A. Brand.

The Commission focused on the Periodic Table of the Isotopes that was featured in an article published in Chemistry International as well as a separate pull-out (Vol. 33 No. 2 and Vol. 33 No. 4). This table features colour coding to distinguish between elements that have two or more stable isotopes and the atomic weights of these elements are given as atomic weight intervals; elements with two or more stable isotopes that are not constants of nature and the upper and lower bounds of atomic weights have not been evaluated by the Commission yet; elements that have one stable isotope and an atomic weight that is constant in Nature; and finally elements that have no stable isotopes. The Periodic Table of the Isotopes also features pie charts that indicate the relative stable isotopic composition of the elements. This Table will play a key role in education and outreach to inform students that chemical elements are made up of stable isotopes and unstable isotopes, while displaying their properties and applications in everyday experiences.

Increased activity in the isotopic abundance research community necessitated in the Subcommittee on Isotopic Abundance Measurements (SIAM) evaluating 82 peer-reviewed publications. Based on this work, the Commission changed the standard atomic weights of five elements based on recent determinations of isotopic abundances and reviews of previous isotopic abundances and atomic masses. The new atomic weights are as follows:

bromine: from 79.904 +/- 0.001 to the interval 79.900 – 79.906

germanium: from 72.63 +/- 0.01 to 72.630 +/- 0.008

indium: from 114.814 +/- 0.003 to 114.818 +/- 0.001

magnesium: from 24.3050 +/- 0.0006 to the interval 24.3040 – 24.3061

mercury: 200.59 +/- 0.02 to 200.592 +/- 0.003

These changes in the atomic weights will be published in a new Table of Standard Atomic Weights 2011, which will be submitted for publication in Pure and Applied Chemistry (*PAC*) by the end of 2011.

The Subcommittee for Natural Assessment of Fundamental Understanding (SNAFU) presented work being done to assist users in the use of the new atomic weight intervals and accompanying figures. The Commission recognized that education of the user community is essential for future understanding of the atomic weight intervals, which reflect the fact that atomic weights are not constants in Nature.

**Commission Members 2012 - 2013:**

(a) Titular Members

Dr. R. Schönberg  
Dr. W. A. Brand (Chair)  
Dr. M. Gröning  
Dr. T. Hirata  
Dr. J. Meija (Secretary)  
Dr. T. Prohaska  
Prof. X.K. Zhu

(b) Associate Members:

Dr. M. Berglund  
Dr. M. E. Wieser  
G. Singleton

(c) National representatives:

Dr. J.K Böhlke (USA)  
Prof. P. De Bièvre (Belgium)  
Dr. S. Yoneda (Japan)  
Dr. T. Walczyk (Switzerland)

(d) Membership of subcommittees:

*1. Subcommittee for Isotopic Abundance Measurements (SIAM)*

Dr. Michael Berglund  
Dr. Robert D. Loss  
Dr. John Karl Böhlke  
Dr. Willi Brand  
Dr. Tyler B. Coplen  
Prof. Paul De Bièvre  
Prof. Tiping Ding  
Dr. Manfred Gröning (Secretary)  
Dr. Takafumi Hirata  
Dr. Norman E. Holden  
Dr. Juris Meija

Dr. Thomas Prohaska  
Dr. Ronny Schönberg (Chair)  
Glenda Singleton  
Dr. Thomas Walczyk  
Dr. Michael Wieser  
Dr. Shigeku Yoneda  
Dr. Xiang Kun Zhu

*2. Subcommittee for Natural Assessment of Fundamental Understanding. The purpose of this Subcommittee is to promote and provide educational materials on the significance and use of Isotope Abundances and Atomic Weights.*

Dr. John Karl Böhlke  
Dr. Tyler B. Coplen  
Prof. Paul De Bièvre  
Dr. Norman E. Holden (Chair)  
Dr. Michael Wieser

*3. Subcommittee for Stable Isotope Reference Material Assessment.*

Dr. Michael Berglund  
Dr. John Karl Böhlke  
Dr. Willi Brand (Chair)  
Dr. Tyler B. Coplen  
Prof. Tiping Ding  
Dr. Manfred Gröning  
Dr. Thomas Prohaska  
Dr. Ronny Schönberg  
Dr. Jochen Vogl  
Dr. Robert Vocke  
Dr. Thomas Walczyk  
Dr. Lu Yang

Michael E. Wieser  
Secretary IUPAC Commission on Isotopic Abundances and Atomic Weights.