6th International IUPAC Conference On Green Chemistry

IUPAC SEMPER VIRIDIS

IUPAC International Union of Pure and Applied Chemistry

Sustainability through Green Chemistry

REPORT

6th International IUPAC Conference on Green Chemistry
4th – 8th September, 2016 – Venezia (Italy)

After Dresden, Moscow, Ottawa, Foz do Iguaçu and Durban the biennial Green Chemistry Conferences moved to Italy.
ICGC-6 took place in Venezia, one of the most beautiful cities in the world, reach of history and culture, which welcomes each year more than 20 million visitors from all over the world.
The Centro Culturale Candiani and the Teatro Toniolo of Venezia Mestre hosted the five-day scientific event which was held on 4th-8th of September.

The 6th International IUPAC Conference on Green Chemistry belongs to the conference series of the IUPAC Subcommittee on Green Chemistry – Division III and was proposed by its Chairman, Prof. Pietro Tundo from Ca' Foscari University of Venezia, Member of the IUPAC Bureau. Prof. Tundo managed the event organization together with the Organizing Committee composed of Prof. Fabio Aricó, Prof. Lucio Ronchin and Prof. Andrea Vavasori from Ca' Foscari University of Venice and the Secretary of the Conference, Miss Emilia G. Pasta.

The Conference was organized in collaboration with the Consiglio Nazionale dei Chimici and obtained the endorsement of UNESCO, Italian National Commission for UNESCO, Italian National Committee for IUPAC, ICSU, CNR, Società Chimica Italiana, AIRI, IUAV, Royal Society of Chemistry, Ordine dei Chimici di Venezia, Città Metropolitana di Venezia, Città di Venezia, and 7 Italian Ministries: Ministero dell'Ambiente e della Tutela del Territorio e del Mare, Ministero dello Sviluppo Economico, Ministero della Giustizia, Ministero dei Beni e delle Attività Culturali e del Turismo, Ministero dell'Istruzione, dell'Università e della Ricerca, Ministero della Salute, Ministero degli Affari Esteri e della Cooperazione Internazionale.
It was supported by Ca' Foscari University of Venice and Regione del Veneto and it was sponsored by: PhosAgro, the Organisation for the Prohibition of Chemical Weapons (OPCW); as platinum sponsor Milestone, as gold sponsors Mapei, Cefic, L'Oréal and Ecopneus; as silver sponsors Nemo Glass and Perkin Elmer and as bronze sponsors Biogest and Pirelli.

The conference was divided into 5 topics:

- Green Materials;
- Green Industrial Processes and Molecular Innovation;
- Green Bioprocesses;

- Green Energy;
- Green Policy and Education.

ICGC-6 kicked off on Monday, the 4th of September at the Teatro Toniolo of Venezia Mestre with Prof. Tundo's welcome message.
Then, the following personalities took the floor: Michele Bugliesi - Rector of the University of Venice, Paolo Pellegrini - City of Venice, Romain Murenzi - UNESCO Director for Science Policy and Capacity Building, Andrei Guriev - CEO of PhosAgro, David Black – Secretary General of International Council for Science (ICSU), Xiaohui Wu - Head of the OPCW International Cooperation Branch, Nausicaa Orlandi - President of the Consiglio Nazionale dei Chimici, Mauro Marchetti - Consiglio Nazionale delle Ricerche and Carlos Tollinche - ChemRawn Chairman, IUPAC.
After these contributions, two awards were presented: ChemRawn Award for Green and Atmospheric Chemistry and PhosAgro/UNESCO/IUPAC awards.
The winner of the the 2016 IUPAC – CHEMRAWN VII for Green Chemistry is Dr. Ali Maleki, from the Iran University of Science and Technology.
After Dr. Ali Maleki's awarding ceremony, Prof. J. Corish, from the Trinity College, University of Dublin (Ireland) took the floor and run the award-giving to the 6 winners of the 3rd edition of the PhosAgro/UNESCO/IUPAC "Green Chemistry for life" award. He announced the name of the winners and their project. The six winners were: A. Akhmetshina (Russia), I. Carrera (Uruguay), M. Ismail (Pakistan), E. Ravera (Italy), A. S. Elsayed Sayed (Egypt) and W.C. Wanyonyi (Kenya).

6th International IUPAC Conference on Green Chemistry success is in the figures: 580 registrations from 76 countries, 400 active participants, more than 60 different countries, 4 daily parallel sessions, 6 plenary lectures, 20 keynote speeches, 2 symposia, 3 round tables and about 250 original scientific reports.

Below the list of the plenary lectures, their contributions titles and the chairmen of the lectures:

- I. Arends from Delft University of Technology (The Netherlands), "Enzymes as Green Catalysts for conversion of Biobased Molecules"; chairman: B. Han - Chinese Academy of Sciences, Institute of Chemistry (China);
- C.J. Li from McGill University, Montreal (Canada), "Exploration of New Chemical Reactivities for Synthetic Efficiency"; chairman: J. Scott - Center for Sustainable Chemical Technologies - University of Bath (UK);
- T. Tatsumi from Tokyo Institute of Technology (Japan), "Advanced Zeolite Catalysts for Sustainable Production of Basic Chemicals"; chairman: C. Brett - University of Coimbra, (Portugal);
- M. Kayser from BASF (Germany), "Sustainable Chemistry – Addressing future societal challenges"; chairman: A. Citterio - Politecnico di Milano (Italy);
- W. M. Braje from Neuroscience Discovery Research, AbbVie Deutschland GmbH& Co. KG, Ludwigshafen (Germany), "Chemistry in water using micelles: Applications in the pharmaceutical industry"; chairman: P. Tundo - Ca'Foscari University of Venice (Italy);
- F. Galembeck from University of Campinas (Brazil) "Synergy in Bioenergy, Food and Materials from Biomass"; chairman: D. Black - UNSW (Australia), Secretary General of ICSU.

The keynote lectures and their chairmen were the following:

September, the 5th afternoon

- Green Materials session: F. B. Sevilla III from Research Center for the Natural and Applied Sciences, University of Santo Tomas, Manila (Philippines), "Green Analytical Chemistry: Chemical Sensors Based on Green-Synthesized Nanostructured Reagents"; chairmen: E. Mantovani and A. Citterio - Politecnico di Milano (Italy);
- Green Bioprocesses session: A. G. Corrêa from Centre of Excellence for Research in Sustainable Chemistry, Department of Chemistry, Federal University of São Carlos, São Carlos, SP (Brazil), "Organocatalytic Multicomponent Reactions in the Discovery of Enzyme Inhibitors"; chairman: M. Marchetti - CNR ICB (Italy);
- OPCW symposium: X. Wu from OPCW, The Hague (The Netherlands), "Promoting peaceful chemistry and ensuring chemical safety, security and sustainability - The OPCW's role and its initiative on Green Chemistry" – chairman: X. Wu;
- Restoration of Cultural Heritage session: G. Ferrari from Research & Development Laboratories, Mapei S.p.A. (Italy), "New Sustainable Technology to Recover Returned Concrete"; chairman: A. Vavasori – Ca' Foscari University of Venice (Italy).

September, the 6th morning

- Green Materials session: P. Metrangolo from DCMIC "G. Natta", Politecnico di Milano (Italy), "Innovative Solutions for a Greener Fluorine Chemistry"; chairman: M. Galimberti – "G. Natta" Politecnico di Milano (Italy);
- Green Bioprocesses session: L.N. He from State Key Laboratory and Institute of Elemento-Organic Chemistry, Nankai University (China), "Carbon Dioxide Chemistry: Carbon Capture and in Situ Conversion"; chairman: A. Vavasori – Ca' Foscari University of Venice (Italy);
- Industrial Processes and Molecular Innovation session: O.M. Demchuk from Department of Organic Chemistry, Maria Curie-Sklodowska University in Lublin (Poland), "New Green Catalysts for Cross-coupling Reactions"; chairmen: P. Jessop – Queen's University (Canada) and C. Mota – Federal University of Rio de Janeiro (Brazil);
- UNESCO/PhosAgro/IUPAC symposium: I. Evstigneeva from OJSC PhosAgro (Russia): "Reducing heavy metals in our food chain with greener mineral fertilizers"; chairman: J. Corish - Trinity College, University of Dublin (Ireland).

September, the 6th afternoon

- Green Materials session: S. Tantayanon from Department of Chemistry of Chulalongkorn University, Bangkok (Thailand), "Chrysophyllum cainito (Star apple) leaf extract stabilized colloidal metal nanoparticles and their applications"; chairman: A. Visa – Institute of Chemistry of Timisoara, Romanian Academy (Romania);
- Green Bioprocesses Session: D. Bianchi from Eni S.p.A. - Renewable Energy and Environmental R&D Center - Istituto eni Donegani (Italy), "From Biomass to Advanced Biofuels"; chairman: Liang-Nian He from State Key Laboratory and Institute of Elemento-Organic Chemistry, Nankai University (China);
- Industrial Processes and Molecular Innovation session: W. Zhang from Department of Chemistry, University of Massachusetts Boston (USA), "Pot-Economic Cascade Reactions with Recyclable Organocatalysts"; chairman: L. Vaccaro – University of Perugia (Italy);

- UNESCO/PhosAgro/IUPAC symposium: N. Tarasova from IUPAC (Russia), "Chemical Footprints, Green Chemistry, Sustainable Development Goals"; chairman: J. Corish - Trinity College, University of Dublin (Ireland).

September, the 7th morning

- Green Materials session: L. Giannini from Pirelli Tyre SpA (Italy), "The Sustainable Development Challenge: Pirelli Tyre's View"; chairman: A. Makarova - D. Mendeleev University of Chemical Technology (Russia);
- Policy session: M. Philippe from L'Oréal (France), "L'Oréal's Commitment to Green and Sustainable Chemistry"; chairman: X. Wu – OPCW, (The Netherlands) and J.S. Corish – Trinity College Dublin (Ireland);
- Industrial Processes and Molecular Innovation Session: C.J.A. Mota from Universidade Federal do Rio de Janeiro (Brazil), "A Green Procedure for Solketal Production from Acetone and Glycerol using CO2 as Switchable Catalyst"; chairman: W. Zhang – Department of Chemistry, University of Massachusetts Boston (USA);
- Green Energy session: T.R. Zhang from Key Laboratory of Photochemical Conversion and Optoelectronic Materials/Technical Institute of Physics and Chemistry, Chinese Academy of Sciences (China), "Rational Design of Nanostructured Photocatalysts for Efficient Solar Fuels"; chairman: G. Reginato – ICCOM-CNR (Italy);

September, the 8th morning

- Green Energy session: G. Reginato from CNR-ICCOM (Italy), "Design and Synthesis of Organic Dyes and Their Application in New Generation Photovoltaics"; chairmen: C. Tollinche – Chairman ChemRawn, IUPAC and L. Ronchin – Ca'Foscari University of Venice (Italy);
- Education session: V.G. Zuin from Department of Chemistry, Federal University of São Carlos, (Brazil) and Green Chemistry Centre of Excellence, University of York (UK), "Building biorefineries for the bioeconomy: an interdisciplinary postgraduate green chemistry course"; chairman L. Mammino – Department of Chemistry, University of Venda (South Africa);
- Industrial Processes and Molecular Innovation session: L. Vaccaro from Laboratory of Green Synthetic Organic Chemistry, CEMIN, Università di Perugia (Italy), "Definition of green synthetic tools based on safer, recoverable and biomass derived reaction media"; chairman: G. Resnati – Politecnico di Milano (Italy) and N.V. Plechkova - QUILL Research Centre, Queens University Belfast (UK);
- Industrial Processes and Molecular Innovation session: I. Evstigneeva from OJSC PhosAgro (Russia); chairman: F. Aricò – Ca' Foscari University of Venice (Italy).

Two symposia of international relevance took place: one organized by UNESCO, PhosAgro and IUPAC while the other was sponsored by OPCW (Organisation for the Prohibition of Chemical Weapons), which looks at Green Chemistry as a principle and a mean to oppose military usage of chemical compounds.

With UNESCO support new ideas arose from the application of Green Chemistry to restoration and cultural values conservation, while pharmaceutical industry brought experiences and data on chemical reaction performed by using water in place of chemical solvents.

Three open round tables gave the opportunity to the attendees to deepen some of the issues addressed by the participants.
The first was dedicated to the industries. Actually, the massive participation of industries and companies, both Italian and international, was one of the great success of the Conference.
Industries and companies of different production sectors agreed on future industrial strategies proposed by IUPAC, being considered a scientifically valid, independent and trustworthy institution.
As an example, eni thoroughly explained Marghera hydrogenation plant technical aspects; Mapei showcased the usage of recycled materials in building industry; Pirelli talked about innovative production coming from renewable materials.

As the Conference Secretariat received many scientific proposals concerning the analysis, utilization, exploitation and the structure highlighting of plants in Africa and India the Conference Organizing Committee decided to organize a second round table to open a dialogue between people coming from these countries. In fact, considering the vastness of the African continent and a country like India, it often happens to be difficult for people belonging to these geographical areas to meet each other.

The theme of the third round table was education and took place on September, the 8th after the education-dedicated session. It was an interesting opportunity for comparison and dialogue as many young researches, students and representative of international organisations gave their opinion on the best way to teach, to learn and to share knowledge.

The closing ceremony saw the contribution of Ali Maleki, who had the opportunity of illustrating the project that allowed him to win the Chemrawn prize. The title of his oral presentation was "Green Reaction Media Protocols: From Solvent-Free to Catalysis State-of-the-Art".

The awarding ceremony of the poster prizes took place during the closing ceremony as well. The participants had the opportunity of exposing all their poster contributions both on Monday and on Tuesday.
It is certain that the poster sessions could be considered one of the greatest success of the 6th International IUPAC Conference on Green Chemistry, for the originality and the high scientific value of the contributions, for the significant number of young people that shares their interesting researches with the other attendees and for the interest demonstrated by the participants in the session. And it was a success not only for the event itself but for the conferences on green chemistry in general, as it was the first time that such a great and rich poster session took place. A record was undoubtedly established.

The winners of the certificates were:
- Daichi Nakayama, Muroran Institute of Technology (Japan);
- Yuki Takada, Graduate School of Science, Nagoya University (Japan);
- Klara Čebular, Department of Physical and Organic Chemistry, Jožef Stefan Institute (Slovenia).

The winners of the publications were:
- Stefan B. Lawrenson, Green Chemistry Centre of Excellent, Department of Chemistry, University of York (UK);
- Stefania Trita, TU Kaiserslautern (Germany);
- Roxanne Brion-Roby, Université du Québec à Rimouski (Canada).

But ICGC-6 was not only a great scientific event, as some space and time have been dedicated to social gathering and networking as well.
A social event took place on Wednesday, the 7th when all the participants were invited to make a boat trip around the Venice lagoon. On board of a big motor ship the attendees had lunch and had the opportunity of seeing the city of Venice from the Giudecca Canal, visiting Burano and Torcello and having a panoramic view of the Venetian Arsenal.
Furthermore, the Organizing Committee chose an exclusive location for the conference Gala Dinner as it was held at the Venice Casino, hosted by Ca' Vendramin Calergi, an historical building on the Grand Canal, great example of renaissance style and Wagner's last dwelling place. The dinner was accompanied by live classical music.

The Organizing Committee expectations were completely met.
During several sessions national relevance issues were discussed.
New challenges in different sectors were undertaken by the 400 researchers and scientists that gathered in Venice: restoration and cultural values conservation, chemical weapons prohibition, innovative pharmaceutical production processes, environmental protection. The chemical industry, from "Twentieth century monster" responsible for development and also environmental and health issues for mankind, becomes leader of the sustainable development through decades of day by day researches in thousands of universities and laboratories, being look at as a new hope for populations all around the world.

Considering the great successes achieved in Venice, IUPAC decided to establish a permanent Committee on Green Chemistry. The next editions of the International Conference on Green Chemistry will be held in Moscow (Russia) in October 2017 and in Bangkok (Thailand) in September 2018.

Venice, September 26th, 2016

Pictures of Venice Conference at www.greeniupac2016.eu/photo-gallery/

Pictures by PhosAgro at
https://drive.google.com/open?id=0B8tzJl8cRButSHpZNnBDWkNNTms

More information about IUPAC International Conferences on Green Chemistry on Wikipedia: https://en.wikipedia.org/wiki/International_Conference_on_Green_Chemistry