

Chemistry Addressing the UN-17 Sustainable Development Goals

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by:

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IUPAC Interdivisional Committee on Green Chemistry for Sustainable Development

<https://iupac.org/body/041>

INTERNATIONAL UNION ON PURE AND APPLIED CHEMISTRY, IUPAC

IUPAC serves the international scientific endeavor in the dual function of a fundamental science and mission-oriented Union. The Union is in a unique position to contribute to the central interdisciplinary chemical sciences. <https://iupac.org/>

Irina Bokova, former Director-General of UNESCO, said that (St Petersburg, 2 June 2017): *

We need chemistry to move forward the 2030 Agenda for Sustainable Development.

We need chemistry to eradicate poverty.

We need chemistry to bolster health.

We need chemistry to mitigate the impacts of climate change

In a word, we need chemistry for human rights and dignity, to leave no one behind.

Not just any chemistry... We need green chemistry... sustainable chemistry...chemistry that respects the boundaries of the planet...chemistry that is inclusive, that works for the benefit of all...Indeed, the modern world, as never before, needs green chemistry.

* <http://unesdoc.unesco.org/images/0024/002497/249743e.pdf>

TOPICS ON GREEN/SUSTAINABLE CHEMISTRY

(approved at the OECD meeting in Paris, June 6, 1999)

- Use of Alternative Feedstocks
- Use of Innocuous Reagents
- Employing Natural Processes
- Use of Alternative Solvents
- Design of Safer Chemicals
- Developing Alternative Reaction Conditions
- Minimizing Energy Consumption

In particular:

Exploitation of natural resources

Protection of the environment

Energy issues
Inherently safe processes and products
Pollution prevention
Benign by Design
Toxicology
Waste reduction

The increasing importance and development of Green and Sustainable Chemistry is truly beyond all expectation. This great achievement cannot be addressed solely to the intuition had by pioneers 25 years ago, but mainly to the current international agreement and support, which have found in the Green and Sustainable Chemistry the ideal tool for realising its own needs and principles.

Today, many countries see Chemistry through Green Chemistry as the ideal tool for realising their particular needs: this means that people all around the world have confidence in Science, since they believe that their problems can be solved by advancements of Science and the Technology. Accordingly, Green Chemistry might be seen as that field in Chemistry which directly responds to the requests of humankind.

Moreover, different Countries have different demands; this convergent consensus poses additional responsibility to the Policy Makers. From its side, chemistry can provide answers according to the UN 17 SDGs.

The Interdivisional Committee on Green Chemistry for Sustainable Development, ICGCSD

<https://iupac.org/body/041>

The IUPAC ICGCSD initiates, promotes, and coordinates the work of the Union in the area of green and sustainable chemistry and sustainable development.

A few publications available:

<http://www.incaweb.org/education/ssgc.php>

<http://www.incaweb.org/publications/gcseries.php>

Have a look also at: <https://iupac.org/member/pietro-tundo/>

ICGCSD INTERNATIONAL NETWORKING COLLABORATIONS WITH:

OECD Organization of Economic Cooperation and Development

OPCW Organization of Prohibition of Chemical Weapons

ISC International Science Council

UNESCO

ISC₃ International Sustainable Chemistry Collaborative Centre

ICGCSD FACTS

INTERNATIONAL CONFERENCES

The perception that the society has of the role of chemistry took advantage by these IUPAC Conferences. Green Chemistry fasters the development of industrially significant and implementable breakthrough technologies.

ICGCSD established its own International conference on Green Chemistry since 2006: after Dresden, Moscow, Ottawa, Foz do Iguaçu and Durban, the IUPAC Green Chemistry Conferences was held in Venice.

6th IUPAC International Green Chemistry Conference , Venice 4th-8th September, 2016.

Program and information: <https://iupac.org/event/6th-international-iupac-conference-on-green-chemistry/> and www.greeniupac2016.eu

Facebook of the Conference: <https://www.facebook.com/greeniupac2016/>

IUPAC Conferences on Green Chemistry are reported on Wikipedia

https://en.wikipedia.org/wiki/International_Conference_on_Green_Chemistry

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After Venice, the Conference location moved to Moscow (2017) and Bangkok (2018). Next conference will be held I Athens (2020).

POSTGRADUATE SUMMER SCHOOLS ON GREEN CHEMISTRY

POSTGRADUATE SUMMER SCHOOL ON GREEN CHEMISTRY, Venice, Italy 7-13 July 2016

<https://www.unive.it/pag/29448/> and <http://www.unive.it/greens2018>

The IUPAC Postgraduate Summer School on Green Chemistry took place in Venice on 7-13 July 2018. The Summer School received the endorsement of the European Year of Cultural Heritage 2018 (<http://annoeuropeo2018.beniculturali.it/en/eventi/3025/>)

Justification and commitment

The top-level and diverse range of topics offered for discussion at the Summer Schools provided to the students the chance to look around, exchange their scientific knowledge and establish important links with other participants and professors for fruitful joint projects and research activities.

Moreover, the rigorous selection of the participants contributed to form a class of high cultural level students, who certainly find themselves at a point of their life where they are ready to invest

their talents and scientific know-how for their future professional careers in a mature and responsible way.

This was a real success for this Summer School, since this opportunity will speed up the participants' careers as it occurred in the past. In fact, as far as this 2018 Summer School is concerned, indeed three Alumni who now occupy important positions in their respective countries: Prof. Egid Mubofu, Prof. Rafael Luque and Prof. Peter Licence, came back to the School as teachers.

IUPAC Postgraduate Summer School on Green Chemistry, 12-19 May 2019 – Dar es Salaam

http://www.tcs-tz.org/iupac_summer_school_2019.htm and

<https://iupac.org/event/iupac-for-africa-postgraduate-summer-school-on-green-chemistry/>

Attending students were from different countries worldwide including Burundi, Ethiopia, Egypt, Uganda, Kenya, Rwanda, Morocco, Sudan, South Sudan, Nigeria, Senegal, Ghana, Cameroon, Botswana, Zimbabwe, South Africa, India, China, Portugal, United Kingdom, Italy and United States of America.

This summer school has given a unique opportunity to network and exchange ideas in Africa.

The choice of Tanzania as the host country for the first IUPAC Postgraduate Summer School in Africa has offered the opportunity to more collaboration for African chemists, chemical institutions, universities and chemical societies.

85 Selected post-graduated attendees and 16 resource persons coming from 22 different countries participated in the Summer School in Dar es Salaam, Tanzania. In total, 143 applications were received, and 51 paying students were considered eligible to attend the school after a thorough selection by the Organizing Committee based on their CVs and list of publications. 53 Scholarship applications were received by February 28th 2019 from students coming from developing countries. A Scientific Committee composed of 8 IUPAC members selected a first list of 36 applications on merit bases out of the 53 received scholarship applications. The first 34 students of the list were awarded with a scholarship to attend the school from IUPAC, UNEP, PhosAgro, ISC₃, OPCW and IUCEA.

ICGCSD AWARDS AND GRANTS

CHEMRAWN VII Prize for Green Chemistry

<https://iupac.org/what-we-do/awards/chemrawn-vii-prize>

This Prize on Green Chemistry was first announced in August 2008 and since, has been awarded every two years at the IUPAC International Conference on Green Chemistry. The Prize of USD 5000 is granted to a young investigator (less than 45 years of age) from an emerging region who is actively contributing to research in atmospheric and green chemistry.

The PhosAgro/UNESCO/IUPAC Partnership in Green Chemistry for Life Grant Programme

<http://www.unesco.org/new/en/natural-sciences/science-technology/basic-sciences/chemistry/green-chemistry-for-life>

Over the course of 8 years, the project will offer research grants of up to US\$30,000 to scientists aged 39 and under with an innovative research project. The 6th call is open for young scientists until 31 August 2019.

IUPAC- Zhejiang NHU International Award for Advancements in Green Chemistry

<https://iupac.org/iupac-zhejiang-nhu-international-award>

Encouraging young professional chemists and experienced chemists emphasising the importance of advancements in Green Chemistry and the value of the experimental sciences to human progress.

Three prizes awarded to three early career chemists, 2,000 US\$ each, to qualified PhD chemists evaluated based on the quality of their theses work.

One prize awarded to an experienced chemist (10,000 US\$) who should have made significant contribution to green/sustainable chemistry throughout their career.

ICGCSD PROJECTS COORDINATION

PRELIMINARY ASSESSMENT OF THE CONTRIBUTION OF IUPAC PROJECTS (2000-2019) TO THE ACHIEVEMENT OF THE UNITED NATIONS SUSTAINABLE DEVELOPMENT GOALS

IUPAC Projects carried out in the last 20 years against the UN SDGs identify the long-lasting synergy between the IUPAC and SDGs. Specifically, the IUPAC projects were classified according to the Committees and Divisions. The total number of the preselected IUPAC projects is **309**. List is available upon request.

EVENT ORGANIZATION

IUPAC General Assembly and Congress, Paris July 8th, 2019

SPECIAL SYMPOSIUM 8.5: CHEMISTRY ADDRESSING THE UN-17 SUSTAINABLE DEVELOPMENT GOALS.

Abstracts available upon request.

Statement of ICGCSD on Green Chemistry and Sustainable Development

While we pay attention to the increasing emission of CO₂ and the increasing number of new chemical compounds that are spreading in the environment, it is difficult to foresee an end to this sinister and destructive trend. Nature is not in a hurry but humankind is.

A new partnership is necessary among academic, governmental and industrial researchers, to cooperate in the management of sustainable development. A direct connection and shared responsibilities should be established among IUPAC, International Organizations and Industry for sustainable development to be pursued.

FINAL REMARKS

The need for science in support of sustainable development is now much more evident. Responsible answers need to be firmly based, long lasting and innovative in order that humanity faces the next challenges in relation to the environment, health, food, energy and water supply, the use of natural resources. The building of a new perception of science is necessary. Humankind ask us this.

Advancements of Science and the Technology to the daily life aims will contribute directly to the improvement of the life conditions of the population. Science education, science policy and fundamental research are also key to sustainable development.

Chemistry can provide answers through Green Chemistry according to the UN 17 SDGs.

Climate Change (Research and Education) is just one example focused to SIDS present and future needs.

Publication: THE GLOBAL CLIMATE CHANGE - The Greenhouse Effect and the Depletion of the Ozone Layer

http://www.incaweb.org/publications/pdf/climate_monograph_en.pdf

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http://www.unive.it/nqcontent.cfm?a_id=86656&pid=5591778

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