SULTANATE OF OMAN
MINISTRY OF EDUCATION

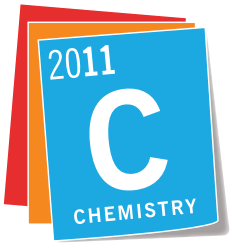
International Year of
CHEMISTRY
2011

Chemistry - our life, our future




National Report on the International Year of Chemistry 2011 Sultanate of Oman

Kemi - vårt
Chemie - ons lewe, ons toekoms
الكيمياء - حياتنا ومستقبلنا
Química - nossa vida, nosso futuro
Chemio-to nasze życie i nasza przyszłość
化学 - 私たちの生活、私たちの未来
Chemie - ons leven, onze toekomst
LA CHIMIE - NOTRE VIE, NOTRE AVENIR
Chemistry - Botshelo jwa rona, bokamoso jwa rona
Kemia - elämämme, tulevaisuutemme
Kjemi -
Chemistry – ijyi
Kimia- Kehidupan kita
Kemi- vårt liv- v
কায়ন - মোদের জীবন, মো
Ceimic - ár mbeatha,
ија – наш живот, наша буд



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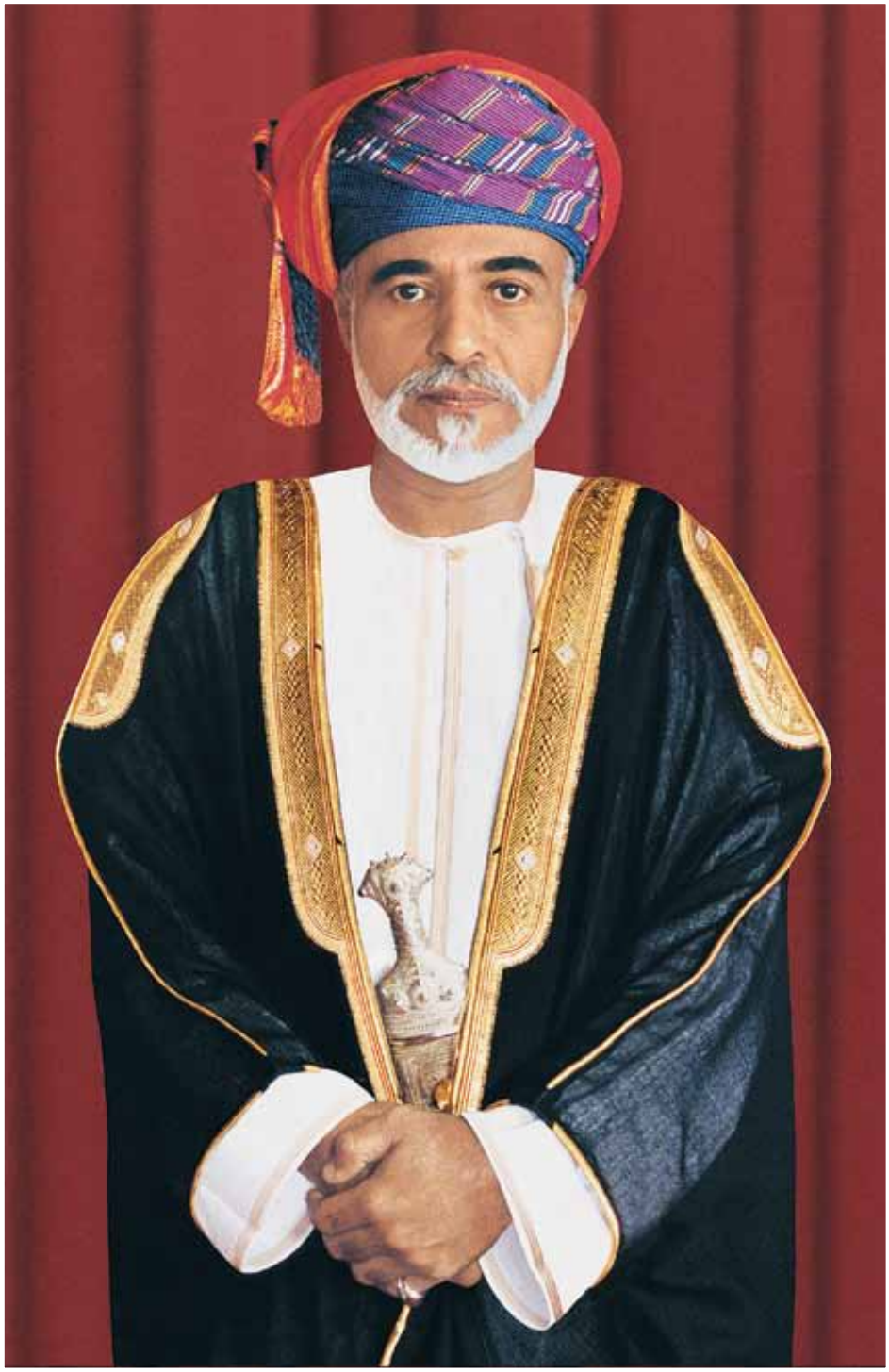
National Report on the
International Year of Chemistry
Sultanate of Oman



HIS MAJESTY
SULTAN QABOOS BIN SAID

"The human being, as we have always said, is the power, the instrument and the ultimate aim of national development. Thus we exert every effort to provide him with these essential qualities so that we can all, together, build our nation. You are aware that there are countries in this world which do not possess rich natural resources, but nevertheless have cared for their people and directed them in the right direction, developed their skills and provided them with technological expertness in order to face their domestic and international evolution. Therefore, their innate abilities have been released and their inventions have been eagerly sought throughout the world. By this means they have taken their place in the forefront of the developed countries."

Speech by H. M. Sultan Qaboos bin Said
Sultan of Oman
on the occasion of the 25th National Day
(Silver Jubilee) 18/11/1995

Chemistry - our life, our future

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Contents

Message from Her Excellency the Minister of Education

The General Assembly of the United Nations adopted a resolution proclaiming 2011 as International Year of Chemistry, placing UNESCO and the International Union of Pure and Applied Chemistry (IUPAC) at the helm of the event, and in January 2011 the first event of the year was launched at the UNESCO head office. The year 2011 was selected to coincide with the 100th anniversary of the award of the Nobel Prize in chemistry to Madame Curie. The unifying theme, 'Chemistry - our life, our future' implies several concepts including celebrating chemistry's achievements, particularly with regard to people's development and well-being, and honouring the contribution of scientists in general, and women scientists in particular.

In support of the IYC 2011 aims, the Oman National Commission for Education, Culture and Science formed the IYC 2011 celebration team, consisting of all the organizations involved with chemistry. The IYC 2011 national team developed a comprehensive and varied plan consistent with the aims of the year. More than forty activities were implemented including seminars, workshops, exhibitions, lectures and publications, in addition to various school activities.

Although the IYC 2011 is now over its aims and objectives continue, and their implementation is continuing. Chemistry is our life, our future, thus we are looking ahead to a bright future, featuring science and directed by chemistry.

Dr. Madiha Ahmed Al-Shaibani
Minister of Education
Chairperson
Oman National Commision for Education,
Culture and Science

Chemistry - our life, our future

International Year of Chemistry - 2011

The International Union of Pure and Applied Chemistry (IUPAC) and UNESCO, believed that it was time to celebrate the achievements of chemistry and its contribution to human well-being, and by their recommendation, the UN General Assembly adopted a resolution proclaiming 2011 as the International Year of Chemistry. This was declared during the 36th session meeting in December 2008 in an event witnessing the participation of youth, at the national and international levels. The celebrations continued throughout 2011 by implementing several interactive programs and activities, allowing participation of all local communities.

The International Year of Chemistry 2011 aims to:

- Increase public appreciation of chemistry in meeting world needs
- Increase the interest of young people in chemistry
- Generate enthusiasm for the creative future of chemistry
- Celebrate the 100th anniversary of Madame Marie Curie's Nobel Prize for Chemistry and the founding of the International Association of Chemical Societies.

International Year of Chemistry - 2011 National team

The Oman National Commission for Education, Culture and Science initiated the formation of the national team, involving a number of governmental and private organizations involved with IYC 2011. The team was formed following a decision from H. E. the Minister of Education, the Chairperson of the National Commission. The team was assigned to recommend the IYC 2011 celebration plan, and to encourage other parties to participate and cooperate in implementing the activities. The team was formed under the chairmanship of the Oman National Commission for Education, Culture and Science and representatives from the following parties:

- Ministry of Education
- Ministry of Environment and Climate affairs
- Ministry of Commerce and Industry
- Ministry of Manpower (Higher Technical College)
- Ministry of Regional Municipality and Water Resources
- Sultan Qaboos University
- The Research Council
- Mad Science Centre

Water - a chemical solution

Global Experiment

UNESCO and IUPC explained that the IYC 2011 celebrations will focus on clarifying the role of chemistry and its active contribution in our daily life. The activities will target primarily students throughout the world. The global experiment is a direct translation of the IYC aims, targeting the communities and youth in particular. During the year all the school students interacted with the global experiment project, under the title "Water – A Chemical Solution" in order to identify the water compound, considered the most important life source on earth. The experiment provided students with the opportunity to appreciate the value of water for life, and the importance of chemistry's role in identifying water purity and quality. Students were able to post their results on an international electronic map displaying reports of their discoveries about water quality and treatment in their regions.

The year's main theme **"Water – A Chemical Solution"** provided the opportunity to further highlight the role of chemistry in providing clear water, and explain the relation between water, climate change, human health and energy.

The global experiment directed students to four activities:

- **pH:** students collect data measuring the pH of a sample local water
- **Salinity:** students explore the salinity of their local water
- **Water treatment:** no dirt, no germs: students will learn how to filter and then purify water
- **Desalination - solar power:** Students will construct a solar still from household materials and design and build their own devices

Launching IYC 2011

Oman National Commission for Education, Culture and Science started the IYC 2011 celebrations by inviting all the 26 ASPnet schools in Oman to participate in the celebrations by encouraging all their students to share their experiments with students around the world, and join in the global experiment "Water – A Chemical Solution" in order to highlight water as the most important life source on earth. In cooperation with Jabir bin Zeid for Basic Education, an ASPnet school, several student groups carried out experiments on water and conducted discussions on their results. During this launch several student science projects were implemented within the knowledge development competition, with the participation of more than 200 students and supervisors from across Oman in a special science exhibition designed for this purpose.

Scientific Seminars, Lectures and Forums

Role of Chemistry in Our Life

22 May 2011

The National Commission organized a seminar entitled "Role of Chemistry in Our Life" on May 22nd, 2011. The aim of the seminar was to highlight the achievements of Arab and Muslim chemists, and to focus on their pivotal role in establishing the foundations and principles of this science, and to highlight their innovations and contributions to improving the lives of the human race. The seminar focused in the role of chemistry in our modern life, and the services and facilities provided by this science. In addition, discussion took place on modern methods and technologies in teaching chemistry, the mechanisms and tools through which the science can be introduced to encourage students towards related occupations. Working papers were presented by a number of experts from the various parties involved with IYC 2011. More than 200 participants representing various educational and service organizations from the public and private sectors attended the seminar.

Seminar themes and presentations

The seminar discussed seven papers over three themes:

Theme one:

Muslims and Arabs, and their role in establishing the science of chemistry,

with two papers:

- **The role of Muslims and Arabs in establishing the science of chemistry**

  The seminar was opened with a presentation on the role of Arabs and Muslims in chemistry and its development, by Mr. Mahmoud Mohammed Al Nabhani, Ministry of Education. He explained that in the period from the end of the second century AH to the end of the fourth century AH, translation witnessed a boom in Islamic countries, especially in Baghdad, the capital city of the Abbasid Caliphate. The most important Greek publications were translated into Arabic, and these included the sciences considered beneficial, like chemistry. Following these translations, Muslim scientists started to discuss the principles of the science, adding new discoveries that helped to form the foundations of this science.

- **Jabir Ibn Hayyan, father of chemistry**

  Eng. Suleiman Ali Al Ibri, Public Authority for Electricity and Water, presented a detailed outline of one famous Muslim chemist, Jabir Ibn Hayyan. It was explained that his research and experiments helped to develop the principles and laws of the science of chemistry.

Theme two:

Chemistry in our life, with three papers:

- **The role of chemistry in industry**

  To highlight the various branches of chemistry, and its role in our daily life, Mr. Salim Humeid Al Saidi, SQU, presented a scientific presentation focusing on the various branches of chemistry, including organic chemistry, analytical chemistry, physical chemistry, industrial chemistry, biochemistry, non-organic chemistry, polymer chemistry and subjects related to chemistry such as textiles, pulp and paper, agriculture, environment, radioactivity, and surface chemistry.

- **The role of chemistry in our daily life**

  Mrs. Jihad Jaber Al Busaidi, Head of Petrochemical Specifications Division, Ministry of Commerce and Industry, presented a paper on the role of chemistry in our life. The paper discussed a number of materials and processes closely related to our daily life that originate from chemical reactions, including plastic, glass, textiles and food colouring.

- **Proper management of chemical materials**

  The Ministry of Environment and Climate Affairs has responsibility for the environment in Oman. The ministry monitors the environment, observes the pollutants and takes the required action to protect the environment from any impact. Within this concept Mr. Ahmed Harib Al Bulushi presented a paper on the proper management of chemicals.

Theme three:

Teaching chemistry, with three papers:

- **Creative chemistry teaching**

  Dr. Radiya Nassir Mohammed Al Hashmi, member of the chemistry curricula, Ministry of Education, presented a paper entitled "Creativity and teaching chemistry". The theme introduced types of thinking, drew a distinction between creativity and creative thinking, described the features and phases of the creativity process and the features of innovative students. The speaker then discussed the education of science, explaining that this issue is of great importance and, in view of the fast scientific developments, needs to be continually reviewed to comply with international standards.

- **The water box**

  Discussing the excellent cooperation between the Ministry of Education and private sector organizations, Professor Nabhan Humud Al Khanbashi, member of the chemistry

curricula, D. G. of Curricula Development, presented the educational water box. This relates to environmental education and contains practical activities to increase the students' understanding of water in nature. The project focuses on fresh water, its source, its formation, treatment and recycling for sustainable development.

- **Interactive virtual laboratories**

  Professors Karima Al Bulushi and Saleh Zoomat, from the chemistry faculty, Higher Technical College, presented a paper on the role of computers and modern technology in the chemistry laboratory, discussing the importance of the chemistry laboratory and its role in science application and use. The chemistry lab has played a prominent role in developing our life since most of the inventions around us started as experiments in the chemistry laboratory.

  We have recently witnessed the emergence of interactive virtual laboratories, side by side with the traditional chemistry laboratories. The interactive virtual laboratories (IVL) are flexible, user friendly with excellent computer programmes to allow chemistry scientific experiences for students at all grades, and simulate real laboratories so that users can experience a range of chemistry experiments.

Recommendations of the "Role of Chemistry in Our Life" seminar

The seminar concluded with the speakers agreeing on a number of recommendations. These focused on encouraging students in schools and universities to carry out scientific research, on the role of Arabs and Muslims in advancing science in general, and on focusing on their scientific results, and on highlighting the role of Jabir Ibn Hayyan in advancing science and chemistry. The participants stressed the importance of using environmentally friendly chemicals in industry, on classifying waste, especially household waste, recycling paper, glass and plastic materials and adopting and applying quality management standards (ISO 9000) and (ISO 1400). There was also unanimous agreement on the significance of the use of virtual laboratories alongside traditional laboratories, on encouraging the use of computers and related applications in chemistry, and on initiating chemistry programmes targeting the young and youth during the Ministry of Education's summer programme.

The Role of Omani Women in Science and Development

20 November 2011

The National Commission, in cooperation with the Omani Women Association, organized a forum on the role of Omani women in science and development. The aim of the forum was to highlight the role of Omani women in developing knowledge in science. Six success stories of prominent women and their local and international impact in their respective fields (medicine, chemistry, marine and environmental science and engineering) were presented during the forum. Participants at the forum included Dr. Lubna Humud Al Kharoosi, Director of the Marine and Fisheries Centre, Ministry of Agriculture and Fisheries, Eng. Bushra Jaafar Al Abdawani, founding chairperson of the Omani Association for Voluntary Work, Dr. Adhra Hilal Al Mawali, Head of Pectrology Laboratories, Royal Hospital, Eng. Aza Suleiman Al Ismaili, CEO of United Schools, Eng. Hannat Ali Al Hinai, Talents Coordinator, Prospecting Division, PDO and Mrs. Atika Yahya Al Huseini, chemistry researcher.

The forum was organized within Oman's celebrations of the IYC 2011 and the Science International Day for Peace and Development, celebrated around the world annually on November 10th, as proclaimed by UNESCO in 2001. This event provides an opportunity to recall UNESCO's responsibilities in science and was organized as a follow up to the 1999 International Science Conference, organized by UNESCO and the International Council for Science in Budapest (Hungary).

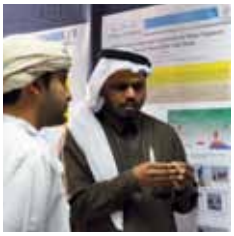
Chemistry Forum, Sharqiya North

17–18 December 2011

The science section (chemistry group), Applied Science Faculty, D. G. of Education in the Sharqiya North Governorate, organized a chemistry forum to celebrate IYC 2011. The forum was held on 17–18 December 2011.

A paper was presented on the first day on the role of Muslim scientists in chemistry, detailing a number of Arab, Muslim and other scientists, and presenting examples of Omani and contemporary scientists and their achievements in chemistry. A second paper on teaching chemistry through role playing was presented by a teacher from the region. Another teacher delivered a presentation on the world of chemistry, consisting of a website with many flashes and scientific sites of benefit to the teaching of chemistry. On the second day, a workshop on micro cycle chemistry and green chemistry involving a variety of fun activities was held for eight groups of teachers and supervisors.

A number of related activities targeting students were also organized along with the forum, including an exhibition in which a number of teachers presented e-technology and publications relevant to science and chemistry, and students from Sinaw School for Basic Education presented a collection of simple chemistry experiments, along with scientific and cultural quizzes.

1st Green Technology Forum "Toward green Chemistry"

27-28 December 2011

Toward green chemistry

Green technology is currently one of the most significant issues in science and engineering. The most important principles of the green technology focus on reducing environmental and health hazards by designing less hazardous products and experiments. Green chemistry principles have been applied to academic and industrial research, to chemical experiments, paints, pesticides, fertilizers, plastic, medicines, electronics, dry cleaning, power generation and water desalination. This methodology will allow scientists to reduce chemicals hazardous to human health and the environment.

The 1st Green technology Forum in Oman "Toward Green Chemistry" was organized by the chemistry group at the Faculty of Science, Sultan Qaboos University (SQU), with the support of the Oman National Commission for Education, Culture and Science. The forum, from 27-28 December 2011, was inaugurated under the auspice of H. H. Dr. Muna Fahad Al Said, Assistant SQU President for External Cooperation. The forum was part of the celebrations for the IYC 2011. The forum aimed to gather chemists and other interested parties to share experiences, research and projects in the field of green chemistry, it also included a series of lectures, workshops, presentations and scientific publications in the following areas:

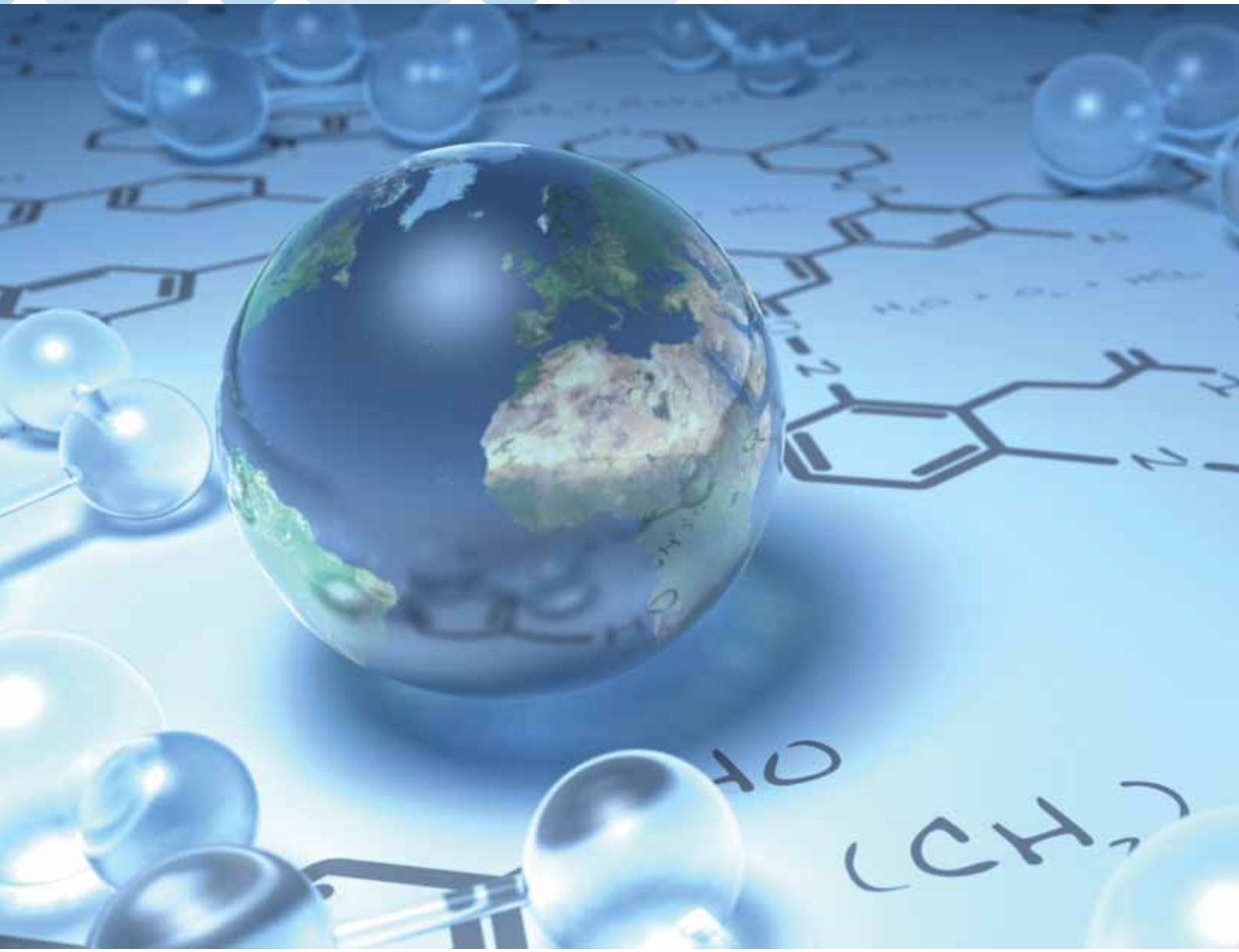
- Water treatment and recycling
- Waste management and treatment
- Efficiency and sustainability of the solar power
- Oil recovery efficiency
- Green technology lab experiments
- Bio fuels

Chemistry is Our Life

26 February 2012

As part of the IYC 2011 celebrations, the National Commission organized a lecture entitled "Chemistry is our life", presented by Dr. Abdul Aziz Abdul Razaq Al Najjar, Assistant Dean for Academic Affairs, Faculty of Studies and Technology, and President of the Kuwaiti Chemist Association.

The lecture discussed three topics. The first was on the importance of science in a country's development, the importance of chemistry in particular, and its interaction with other sciences. The second topic discussed the role of chemistry in the happiness and well-being of mankind, presenting the contributions of certain contemporary chemists and their efforts to develop the discipline. Certain practical applications were presented to highlight the achievements of today and tomorrow, particularly in the education process. The speaker also presented examples from the Korean experiment as a success story. The third topic focused on the importance of teaching sciences, and chemistry in particular, in exciting and attractive ways. The speaker involved the audience in carrying out a number of exciting experiments. In general, the lecture was trying to answer the question asked by the speaker in his opening remarks, "can you imagine life without chemistry?"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International Participation and Competitions

The International Chemistry Olympiad

One of the highlights of the IYC 2011 was Oman' decision to participate in the International Chemistry Olympiad (ICO). The Chemistry Olympiad is an international competition in chemistry for secondary education students. It is an annual event held at the end of the academic year, and lasts for ten days. The event provides the opportunity for approximately 300 students from seventy countries to compete to win the Olympiad medals, paving their way towards better future options and opportunities. The ICO aims to promote cooperation between students, and to encourage the exchange of academic and scientific experience between countries. Most countries prepare for this international competition by organizing a local chemistry Olympiad for the students to qualify for the international competition.

The Olympiad host country prepares and organizes the Olympiad questions, consisting of two parts, one theory and one practical. Each country may participate with a maximum of 4 students, provided that their age is not more than 20 years and are not enrolled at university level.

Based on its belief in the vital and significant role of chemistry in modern life, and confidence in the students' ability – tomorrow's scientists – to shape the future, Oman participates in these international competitions in order to encourage the competing students to seek more knowledge, skills and experience, to develop their self confidence, enhance their ambitions, provide them with the opportunity to network with their peers from around the world and develop their applied skills in chemistry.

Oman contacted the organizers in the USA to express its intention to participate, and received approval to start in the 2013 academic year. The regulations require newly participating countries to organize a national Olympiad on two consecutive years, and to register an observer who will be sent to observe the process of the international Olympiad in 2013 & 2014. Compliance with these regulations will enable Oman to participate as a main member and competitor in the 2015 Olympiad.

Supported by the National Commission ... young researcher participates in the 43rd International IUPAC Chemistry Conference

In recognition of its commitment to develop the capacity of young researchers, the Oman National Commission supported the participation of Miss Atika Yahiya Al Huseini, M.Sc. chemistry student, SQU, in the 43rd IUPAC Chemistry Conference, held from 31 July to 5 August 2011 in San Juan Porto Rico, USA. Atika presented in a paper titled "Novel Fluorinated Ferroelectric Organosiloxane Liquid Crystals" discussing the process of producing liquid crystal used to make TV and computer monitors and other electronics. Atika, who was the only Omani participant at this conference, benefited from the lectures and presentations in various fields of chemistry, together with 3 speeches by three Nobel Prize winners. She also participated in a workshop on teaching chemistry, especially in educational laboratories, and attended several exhibitions associated with the conference exhibiting important books, magazines, publications and tools. Atika is a M.Sc. researcher at SQU and partipated in several events marking the IYC 2011.

Education

"My Summer Growth" summer training programme for the students on "Chemical Applications"

10-21 July 2011

Within the Ministry of Education's summer "growth" programme for students during the summer break, a chemical applications programme was included in all the summer centres in the regions in order to meet the IYC 2011 aims. The programme was included within the 2011 summer activities and covered 10 training hours.

The programme aimed at employing skills and knowledge relevant to chemistry in everyday life, imparting positive values towards the subject, and appreciating the vital role of this science in the development of our life.

The programme included several fun scientific experiments:

- The effect of tea on iron compounds
- Difference between white bread and toasted bread by checking the starch
- Make your own disinfector: gel and cream disinfectants
- Making soap
- Adulterated honey
- Polish silver at home by chemical electronic method
- How to make a battery from a lemon
- Ink to write on tiles
- Making talcum powder
- Make your own almond oil Vaseline
- Magic tricks: magic wand, blue bottle, water on fire

The programme consisted of two phases:

Phase one: training 36 teachers for 10 training hours at two hours daily.

Phase two: training students in the summer centres. Teachers trained groups of students for ten training hours. The programme was implemented in 33 centres, with more than 6,900 students participating. The students provided positive feedback, and suggested that they would share the knowledge they has gained through science groups in their schools.

Ministry of Commerce and Industry joins the students in celebrating IYC 2011

Within its participation in the IYC 2011, the Ministry of Commerce, D. G. of Specifications and Measurements, conducted a number of awareness lectures in schools, focusing on the theme "Chemistry … Our Life … Our Future", the motto of the IYC 2011. The lectures presented information on chemical materials, how it enters the human body and how to apply safety rules in dealing with and storing of the materials, in addition to presenting personal protection equipment and classification of chemical materials according to its degree of hazard.

Regular visits were organized for students to visit the specifications and measurement laboratories and receive a simple theoretical explanation on the requirements of water chemical analysis, and explaining other laboratory experiences. Students also received training on the global water experiment and methods of deriving and analyzing the results.

IYC 2011 at Zeinab Al Thaqfi School for Basic Education

16 October 2011

On 16th October 2011 the chemistry group, SQU, organized an induction visit to Zeinab Al Thaqfi School for Basic Education. During the visit M.Sc. student Thuriya Al Harthi gave a lecture on chemical detergents, discussing its contents, hazards and impact on the environment. Afterwards the students were introduced to the IYC 2011 and its objectives. Two students' chemistry competitions were presented, on chemistry creativity (best event for IYC) and chemistry pioneers (best project), with details of the rules and regulations for registration, delivery and evaluation.

IYC 2011 at Feidh Al Marifa School for Basic Education

20 October 2011

On 20th October 2011 the chemistry group, SQU, organized a visit to Feid Al Marifa School for Basic Education where the group participated with the school radio in organizing a competition. Afterwards, M.Sc. student Atika Al Huseini gave a lecture on hair cleaning materials and chemicals in these products. Then the IYC was introduced and the chemistry creativity and pioneer competitions were presented. This was followed by a visit to the laboratory to carry out several experiments from which the students discovered the scientific base for a number of fun tricks and games. The event was attended by a large number of students.

Water – A Chemical Solution: A Global Experiment

Al Imam Jabir bin Zeid School for Post Basic Education

Imam Jabir bin Zeid School for Post Basic Education, an ASPnet school, joined the world in celebrating the IYC 2011 by carrying out the global experiment announced by UNESCO to celebrate the occasion "Water – A Chemical Solution" aiming to achieve:

- **pH:** students measured the pH of several samples of water
- **Salinity:** students explored the salinity of several samples of water

The experiment was carried out in the chemistry laboratory, and was attended by the school principal and the National Commission. The lab technician prepared the tools and equipment required, and distributed it to four groups, each with five students. The students had prepared for the experiment under the supervision of chemistry teachers. The representative of the National Commission explained the main concept with some instructions prior to starting the experiments.

The students carried out the experiment under the supervision of the school chemistry teacher and lab technician. After the experiments the students recorded the following results: distilled water (pH = 7) saltwater (pH = 7.9) fresh water (pH = 7.1) and murky water (pH = 8).

Fatima bint Qais School for Post Basic Education

Fatima bint Qais School for Post Basic Education celebrated the International day for Water and the IYC, and in cooperation with the UNESCO group, the science group organized several activities including:

1. Working paper titled "Relation of the water cycle with the climate" prepared by a student.
2. Practical experiment to use solar power through a lens to distil saltwater and get fresh water.
3. Measure the salinity in tap water by the weight of an empty glass and full glass, evaporate the water and weigh the glass once more, with the increased weight of the glass being the weight of the salt.

Al Amal Post Basic Education School

A number of students from Al Amal Post Basic Education School carried out the global experiment associated with the International Water Day and IYC 2011. The students went on a field trip to collect samples of water from different sources from around the school. They collected the following samples: Ein Al Kasfa (hot water spring in Oman), irrigation water (traditional irrigation system famous in Oman to extract groundwater), sample from flood rain water and a sample from a still pond. Afterwards the students were divided into groups and they followed the instructions of the global experiment, checking ph, salinity and bacteria. At the end, the students discussed their findings including the rate of materials inspected from various sources and the elements leading to such variation. The experiment was then documented on the experience website.




Training Workshops and Courses

Workshop on Digital Technology in Laboratories

26-28 September 2011

In order to upgrade the technical performance of the lab technicians, and to employ digital technology in the laboratories, the D. G. of Education in Dhofar, the school lab unit, organized a workshop on digital technology from 26-28 September 2011. The workshop was organized in Al Saada School for Basic Education for girls (10-12). The workshop targeted 42 lab technicians and aimed to enable the technician to use technology and electronic probes in experiments.

The workshop included several presentations on various technologies and probes used in chemistry, including the computerized weighting scale, acidity indicator measurement, temperature probe, calibrating droplets probe and dual pressure and temperature probe. A number of lab supervisors took part in presenting these equipments.

Technology in Teaching Chemistry

22-24 October 2011

The Directorate General of Curricula Development, in cooperation with the National Commission, organized a training workshop titled "Technology in Teaching Chemistry" from 22-24 October 2011. Forty teachers and supervisors were trained on a number of modern technologies to teach chemistry.

The workshop highlighted the chemical technologies that have contributed in the advancement of mankind. Technology can play a prominent role in teaching chemistry by simplifying chemistry concepts, enabling students to see molecules and reactions that cannot be seen by the naked eye, by facilitating experiments through the use of purpose built computer programmes including simulation programmes, and by using technology to produce accurate results supported by charts. Technology can be used by students of all age groups, covers the teaching of chemistry in both theory and practice, and can contribute in attracting students toward this subject.

The workshop focused on three main topics. The first was to highlight the crocodile-chemistry simulation programme, through which the teacher can carry out experiments that cannot be completed in the laboratory due to safety or hazardous wastes, or the lengthy time required to carry out the experiment. The programme also enabled accurate results to be obtained, represented in charts that are useful in preparing tests, and assisted in explaining molecule and atom chemical reactions which cannot be seen by the naked eye.

The second topic dealt with the use of micro cycle technology, one of the most advanced technologies to promote the use of laboratories in teaching chemistry. The micro cycle is a kit of the basic materials required in a chemical lab, such as detectors, to enable experiments to be carried out with the minimum consumption of chemical materials. The use of this technology also facilitates waste disposal. The technology is of special benefit to rural schools and students with special needs.

The third topic discussed was the green chemistry, one of the most important issues in chemistry. With international support, many countries are attempting to include it within their curricula and impart its concepts to the students and local communities alike.

"The Spirit of Chemistry" workshop

31 October 2011

On Monday October 31st, 2011, the Saad bin Abada Basic Education School (5–12) in Al Dhahira celebrated the IYC 2011 by organizing a workshop on "the spirit of chemistry".

The spirit of chemistry workshop consisted of experiments associated with the students' life, seeking natural alternatives for chemical materials in order to create a clean environment and the safe use of natural materials, often with better results than with chemical materials. The workshop completed ten experiments, one by two grade five students.

The workshop aimed at introducing and developing the chemical skills of the school students, and to direct them towards learning chemistry, in addition to acquiring basic skills to deal with chemical materials in the lab, and to train them to find natural materials as alternatives to expensive and often harmful commercial materials. The ten experiments consisted of the effect of tea on iron compounds; make your own Vaseline; make your own disinfectant; adulterated honey; does a needle float in water?; difference between white bread and toasted bread; egg and vinegar; natural talc; water burning.

Four schools participated in the workshop: Said bin Jabir School (5–10), Al Rahba Basic Education (1–10), Al Hayal Basic Education (1–12) and the workshop organizer Saad bin Abada Basic Education School (5–12).

"Creativity in Teaching Science" workshop

25-27 February 2012

Within its plan to achieve the IYC 2011 aims, and to participate in celebrating the Omani Teacher's Day, coinciding on the 24th of February every year, the National Commission organized a training workshop attended by more than fifty teachers from across Oman.

The workshop focused on the following topics:

- Introduction and theories on the brain and how to benefit from it in education
- Introduction to various types of intelligence, methods to identify the types of intelligence and ways to develop it
- Introduction to creative thinking and training, and ways that education and technology drive creativity
- Introduction to the most important foundations of chemistry and the skills required in labs
- The environment of creativity and the importance of teaching it
- Strategies to develop convergent and divergent thinking

The last day of the workshop was dedicated to train the teachers on the micro cycle chemical technology, a technology that allows scientific experiments in a safe environment with the least possible quantities that will give the required results by minute instruments and measurements. The technology features rationalization in the use of laboratory equipment and materials, which in turn leads to reducing expenses and chemical waste. This technology is especially useful to the schools lacking certain expensive lab equipment or materials which can be compensated by alternatives from the market.

National and International Days

"Measurements in Chemistry" is the motto of MCI to celebrate the World Metrology Day

20 May 2012

The Ministry of Commerce and Industry (MCI), represented by the D. G. of Specifications and Measurements, joined the rest of the world in celebrating the World Metrology Day, on May 20th, 2011. The slogan for this year's celebration was "Measurements in Chemistry". The selection of chemical measurements to celebrate the day indicates the importance of metrology and its impact on all the sciences, including chemistry. Accurate measurement is a basic requirement, and its importance is not confined to analysts and manufacturers, but covers the entire community. Having the ability to carry out accurate chemical measurements has a great impact on the economy, environment and individuals.

Accurate measurement is one of the most important considerations in any experiment, whether it is in research centres, universities, colleges or industries. Only a slight difference in measurement may result in permanent change.


المؤشر

«التجارة والصناعة» تحتفل باليوم العالمي للكيمياء

Omani Teacher's Day

24 February 2012

On the 24th February of every year the Ministry of Education celebrates the Omani Teacher's Day. The celebration is to emphasize the role of the teacher in the development of the community. On this occasion, H. E. Dr. Madiha Ahmed Al-Shaibani, Minister of Education, addressed a word of thanks and appreciation to all teachers for their role in the upbringing of future generations and preparing them to share in building our country. In her speech, Dr. Madiha said "... the teacher is the main pillar in any academic system, without a trained, active, faithful, (and) passionate...teacher who is fully aware of his/her role no education system can achieve its objectives. There is an increasing need for a teacher who is an entrepreneur, creative and keeps pace with world developments". She encouraged teachers to seek out education and knowledge, and to use it to serve the teaching and education process, and to promote the principles of self learning and scientific thinking in the minds of their students.

To meet the objectives of the IYC 2011, the National Commission organized a workshop for more than 50 teachers from across Oman entitled "Creativity in Teaching Science". The workshop was held on 25-27 February 2012 and consisted of a number of topics including an introduction on theories on the brain and how to benefit from it in education; an introduction to various types of intelligence, and ways to develop it; creativity and the importance of teaching it; and strategies to develop convergent and divergent thinking. The last day of the workshop involved training teachers on micro cycle chemical technology.

Scientific Open Days

Open Day – Chemistry Group, Sultan Qaboos University

13–14 February 2011

Coinciding with IYC 2011, and within the environment campaign, the chemistry group of Sultan Qaboos University organized an open day, consisting of several activities, including an exhibition entitled the Industrial City of Chemistry, which was opened by H. E. the Wali of Seeb. The exhibition presented many exhibits on various academic and entertainment activities, featuring scientific innovation presented by projects from the competition "By our hands we protect it and for future generations we keep it". The campaign started in December 2010. The open day included two courses, one for HSE and the other for the foundation supporting life, and there were also many fun competitions related to chemistry.

Chemistry Carnival

19–20 November 2011

The chemistry group, SQU, organized a chemistry carnival under the slogan "Our life is chemistry" from 19–20 November 2011. The carnival was organized to coincide with the chemistry group's open day. The carnival was inaugurated in the presence of the Dean of Science College and the Deputy Dean for Students Affairs, and was attended by a number of chemistry teachers.

The carnival aimed at highlighting the role of chemistry in our life, and its present and future role, both positive and negative, in order to benefit from the advantages and limit the disadvantages of the discipline. In addition, it presented the new generation of pioneers and highlighted their efforts in serving mankind.

The carnival included a lecture on "Chemistry of life: Life values" by the accredited instructor Helen Sirus. The lecture discussed the life values that students should concentrate on and developed this on how to build the values of chemistry in to our lives. She made the point that interacting with life is similar to the interaction in a tube in the Chemistry lab, and stressed the need to build good relations similar to the reaction relations. The lecture included several activities and a discussion which received very positive impact from the audience.

In the evening, the chemistry group organized a scientific presentation "the charm of chemistry" dazzling the audience with many chemical tricks and experiments, and a short comedy by the students.

The carnival closed by organizing the 1st Chemistry Olympiad in the yard of the faculty of science, supervised by the cultural committee. This is the first time that university students had competed in this competition. The competition included questions on both practice and theory, in addition to questions to the public. The Faculty of Education was awarded the title of the Chemistry Olympiad Champion.

Open day of the IYC 2011 at the Higher Technical College, Muscat

7 February 2012

The Open Day was held on Monday February 7th 2012, at the Higher Technical College,Muscat, to celebrate IYC 2011 and was organized by the science club students, supervised by the chemistry section and sponsored by the Dean of the college.

The programme included a number of themes relating to chemistry, with participants from SQU. Dr. Ibrahim Al Shafi presented a lecture on environmental health and diseases relating to chemistry, reasons and solutions, with an introduction on types of diseases, with examples and photographs, before moving on to toxin formation, accumulation and prevention.

Professor Salim Al Saidi delivered a lecture on safety in laboratories, detailing all the applied and accepted safety procedures, including written or copied instructions, preventive measures and treatment in laboratories. A documentary was presented on the history of discovering the periodic table, and the steps and situations associated with the discovery of certain chemical elements.

The day closed with a student presentation exhibiting various chemistry experiments.

Exhibitions

IYC 2011 and the International Day for Biodiversity exhibition

22 May 2011

The National Commission organized a joint exhibition for the International Year for Chemistry and the International Day for Biodiversity, coinciding with the International Day for Biodiversity.

The exhibition aimed at highlighting Oman's efforts to preserve and maintain the environment, and promote ecotourism with its great potential for Oman. The exhibition also presented student projects showcasing the impact of chemical waste on the environment, and recommended solutions to overcome these problems. During the exhibition books and posters were distributed on the environment, chemical waste and disposal and the impact of chemicals on the environment and health.

A number of public and private institutes participated in the exhibition, including the ministries of Education, Environment and Climate Affairs, Tourism, Agriculture and Fisheries and Manpower, the Higher College of Technology, Sultan Qaboos University, Fun Science Centre and Oman Environment Society.

Chemical exhibition – Higher College of Technology, Muscat

7 February 2012

This exhibition was held within the activities of the open day at the Higher College of Technology, held on February 7th. In the evening, the audience was directed to the college yard to enjoy the exhibition where students presented a number of exciting chemical experiments, recalling ancient chemistry, and chemistry's contribution to the well-being of mankind. This introduced the audience to the exhibition, which was divided into four sections.

The first focused on the origin of chemistry and its relationship with people's beliefs, its development and its entry to the world of experiments and application. In the second section, the guests were encouraged to get involved in a range of fun experiments. The third section was dedicated to the chemistry projects in the college, under the supervision of the academics and teachers. Posters presented detailed summaries of the projects, including the results and recommendations, and these were explained by the students to the guests. Projects included engine oil recycling, lab chemical waste recycling including silver and its derivatives, and a project to make bio-fuel from cooking oil waste.

One of the IYC 2011 aims was to celebrate the 100th anniversary of the award of the Nobel Prize in Chemistry to Mme Curie, who supervised the first studies on tumours using radioactive isotopes. Her studies were also the cause of her death, and the organizers dedicated a special corner for the Cancer Association in honour of the scientist who gave her life for science. The corner featured information about the Cancer Association and its role and activities. The students distributed leaflets on behalf of the Association and commemorative items to stimulate awareness of the disease were sold.


Magic Writing

Commemorative stamp

Postal stamp to commemorate IYC 2011

Postal stamps are considered one of the most important documents issued by a country, and play an important role in celebrating various events. Accordingly, the idea was put forward to issue an official commemorative stamp featuring IYC 2011. The idea started in March 2011 at SQU, in consultation with the National Commission, after which the university president approved and adopted the project. This was followed by coordination between the Ministry of Transport and Communications and Oman Post.

On December 27th, 2011, the stamp was officially launched during the opening ceremony of the 1st Green Technology Forum, under the auspice of H. H. Sayyida Muna Fahad Al Said, Deputy SQU President for External Cooperation. The design of the stamp features a glass flask and tubes used in chemistry laboratories to prepare chemical solutions and reactions, on the upper right side the logo of Oman, and on the left the logo of IYC 2011. The stamp is offered for sale and transactions against a value of one hundred Baisa. Although the IYC 2011 ended at the end of 2011, its memory will last and continue with the development of chemistry throughout the ages.

Publications

The parties participating in the IYC 2011 national celebration team took the initiative to promote and advertise the year's objectives through the media including e-publishing, booklets, posters, articles and covering the event by various media including the TV, radio and newspapers.

IYC Oman page on FaceBook

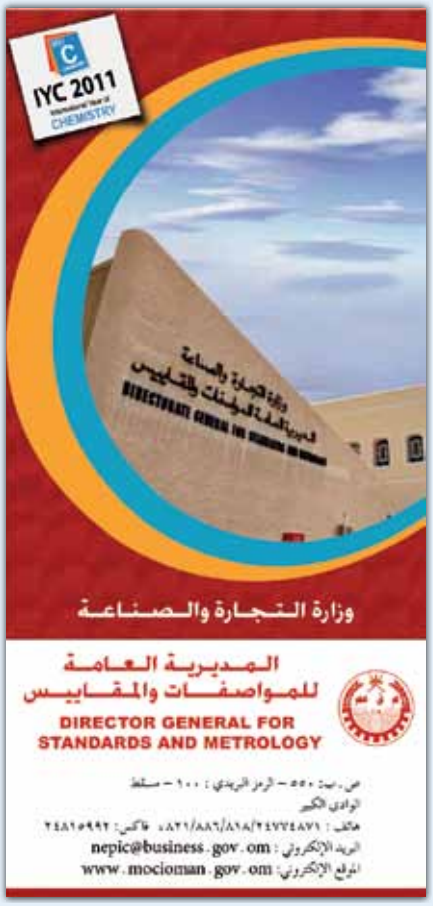
http://www.facebook.com/pages/IYC-Sultanate-of-Oman/125743430829869

Social communication networks are among the most active and attractive sites on the net across the world. It facilitates communication between individuals and organizations within communities. It is hardly surprising, therefore, that many companies and organizations, both public and private, have accounts on these sites, as well as on FaceBook and Twitter. They allow easy communication between the organizations and the communities, and have a tangible cultural and educational role. There are many pages specializing in science and literature.

The IYC, Sultanate of Oman, was established on FaceBook at the beginning of the year in order to advertise the activities and events celebrating the year. The page also played a major role in promoting chemistry education in general and IYC in particular. It helped to raise community awareness on the concept of chemistry ... our life ... our future, and to explain that the role of chemistry is not just about chemical reactions in the laboratories, but a discipline relevant to our daily life. The page also includes subjects relating to the environment, health and industry, information on modern technologies such as nano technology, the focus of the scientists and the people involved in medicine, engineering, agriculture and industry. The page was designed to appeal to the community of various age groups, with video clips to further explain the information.


السنة الدولية للكيمياء ٢٠١١
أهداف السنة الدولية للكيمياء
2011


التجربة العالمية : (الماء ، محلول كيميائي)
http://water.chemistry2011.org
الموقع الإليكتروني الرسمي للسنة الدولية للكيمياء:
www.chemistry2011.org


IYC 2011
وزارة التجارة والصناعة
المديرية العامة للمواصفات والمقاييس
DIRECTOR GENERAL FOR STANDARDS AND METROLOGY
nepic@business.gov.om
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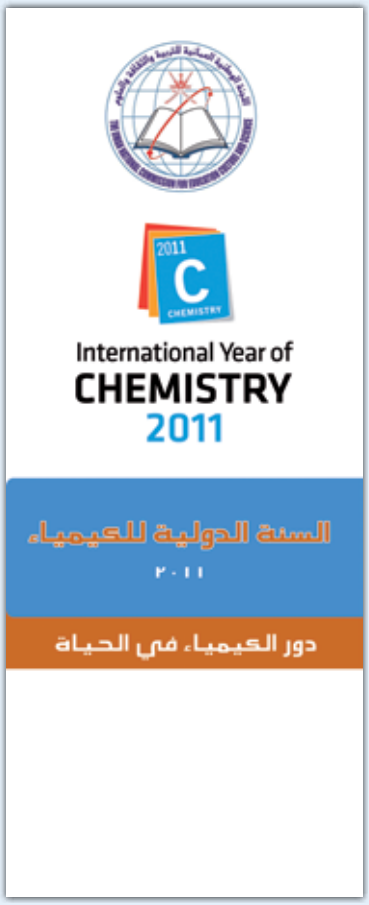
IYC 2011
International Year of CHEMISTRY
MINISTRY OF COMMERCE AND INDUSTRY
DIRECTORATE GENERAL FOR STANDARDS AND METROLOGY
Quality Control Department
Quality Management System Section
P.O. 550 ZIP: 100 - Muscat
Sultanate of Oman
Tel: 24774871/818/886/821, Fax: 24815992
E-mail: nepic@business.gov.om
Website: www.mocioman.gov.om


تدعوكم مجموعة الكيمياء بجامعة السلطان قابوس
مشاركتها الإحتفال بالسنة الدولية للكيمياء
International Year of
CHEMISTRY
2011
كيمياء الإبداع
مسابقة أفضل فعالية لطلاب المدارس
شروط المسابقة:
- أن تخدم الفعالية المقدمة السنة الدولية للكيمياء
وتواكب الاكتشافات والجديد في الكيمياء
- أن يتم توثيق الفعالية المقدمة سواء كان ذلك بتسجيل فيديو
أو صور وكتابة تقرير مفصل عنها
- المسابقة تشمل طلاب المدارس للصفوف (7-12)
آخر موعد لاستلام المشاركات :
2011/12/10
شارك معنا...
وكن جزءا من عالم الإبداع والإبتكار
للتواصل والإستفسار :
chem.squ@hotmail.com


تدعوكم مجموعة الكيمياء بجامعة السلطان قابوس
مشاركتها الإحتفال بالسنة الدولية للكيمياء
International Year of
CHEMISTRY
2011
رواد الكيمياء
مسابقة أفضل مشروع لطلاب المدارس
شروط المسابقة:
1- أن يحور صور المشروع حول أحد المواضيع التالية:
أ- معالجة المياه وإعادة استخدامها.
ب- معالجة النفايات.
ج- الطاقة المستدامة.
2- أن يزيد عدد المشرفين في المشروع عن 5 أشخاص
وبحيث لايتراوح عدد المشاركون فيه من 1-5 طلاب
3- أن يشرف على المشروع معلم الكيمياء
4- يجب تقديم وتوثيق المشروع بأحد الطرق التالية:
بوستر علمي ، مجسم أو بحث
5- المسابقة تشمل طلاب المدارس للصفوف (7-12)
آخر موعد لاستلام المشاركات :
2011/12/10
شارك معنا...
وكن جزءا من عالم الإبداع والإبتكار
للتواصل والإستفسار :
chem.squ@hotmail.com


International Year of
CHEMISTRY
2011
السنة الدولية للكيمياء
٢٠١١
دور الكيمياء في الحياة
التجربة العالمية: " الماء: محلول كيميائي "


International Year of
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السنة الدولية للكيمياء
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International Year of CHEMISTRY 2011

الكيمياء حياتنا .. الكيمياء مستقبلنا

المديرية العامة لتطوير المناهج

الإصدار الأول إبريل ٢٠١١م

السنة الدولية للكيمياء ٢٠١١م

في هذا الإصدار :

تصميم وإخراج
عبدالمنعم المخيطي
مركز إنتاج الكتاب المدرسي والوسائل التعليمية

بمبادرة من أثيوبيا ، أقرت الجمعية العمومية للأمم المتحدة ٢٠١١ لتكون سنة دولية للكيمياء ، International Year of Chemistry لتتزامن مع الذكرى المئوية لحصول مدام كوري على جائزة نوبل للكيمياء . الجدير بالذكر أن المنظمة العالمية للتربية والثقافة والعلوم (اليونيسكو) ترعى الاحتفال بهذه السنة بالتعاون مع الاتحاد الدولي للكيمياء البحتة والتطبيقية .

تدخل الكيمياء في كل جزء من حياتنا وتسهم بشكل بالغ في صياغة مستقبلنا. فكل مادة معروفة غازية كانت أو سائلة أو صلبة أو بلازما تتشكل من مختلف العناصر الكيماوية أو من مزيج من هذه العناصر . وبالنسبة لإيرينابوكوفا المديرة العامة لليونسكو "إن الكيمياء هي الحياة . وهي الرابط مع كل العلوم الأخرى ، خصوصاً حين تبحث عن فهم العناصر المُشكلة للمادة والطاقة ومكونات الحياة".

International Year of CHEMISTRY 2011

الهدف :

إبراز أهمية الكيمياء في حياتنا ومستقبلنا ، ودورها في تحقيق رفاه الشعوب ، والحفاظ على البيئة، وتحقيق التنمية المستدامة. فضلا عن أهميتها في مواجهة التحديات العالمية للعثور على منتجات صديقة للبيئة ، وتوفير الأدوية وتطوير الطاقة المستدامة ، وتنقية الهواء ، وتوفير المياه الصالحة للشرب وقدرتها على إيجاد بدائل للطاقة ، وإسهامها في تحقيق الأمن الغذائي لما يقارب السبعة مليارات نسمة التي تعمّر الكرة الأرضية.

الشعار :

تحمل سنة ٢٠١١ شعار "الكيمياء حياتنا ، الكيمياء مستقبلنا" .

وسيتم التركيز من ٢٧ يناير لغاية ١ ديسمبر ٢٠١١، في مختلف دول العالم المشاركة في هذه الاحتفالية ، على إبراز دور الكيمياء في الحياة وفي صناعة المستقبل . وذلك من خلال قيام كلّ دول العالم بوضع برامج علمية وتثقيفية بقصد التعريف بهذا العلم الذي يدرس المادة وتفاعلاتها وعلاقاتها بالطاقة ، هذا فضلا عن الإشادة بمنجزات علماء الكيمياء ومساهماتهم في خدمة الإنسانية.

هكذا فان السنة الدولية للكيمياء تسعى إلى ترسيخ الاتجاهات الايجابية نحو الكيمياء مع أوسع عدد من الجمهور، وهنا تؤكد إيرينابوكوفا : إن التربية والتعليم يعتبران عاملان أساسيان للنجاح في تأهيل كيميائيي الغد.

مدام كوري ... نجاح حافل

ولدت ماري في بولندا لوالدين معلمين، أما والدها فكان معلم رياضيات وفيزياء وأما والدتها فكانت معلمة في مدرسة داخلية للبنات، وكانت الأخت الصغرى لخمسة أبناء توفي والديهم مما جعلهم يرزحون تحت اليتم والفقر. وعرفت بعبقريتها منذ نعومة أظافرها فكانت الأولى دائماً. نزحت مع أختها الى فرنسا ، وظلت تعمل على تنظيف الزجاجات في معامل كلية العلوم لكي تستطيع إكمال دراستها الجامعية.

عاشت في زمن لمتحظَ المرأة فيه بقدر أو حرية، ولكنها ورغم التحديات كانت أول امراءة تحصل على كرسي الأستاذية في جامعة السوربون بباريس، واستطاعت أن تحصل على جائزةنوبل، تقاسمتها في ١٩٠٣ مع زوجها بيار كوري لاكتشافهما عنصر البولونيوم والراديوم، وفي ١٩١١ حصلت عليها في الكيمياء. لقد كانت واحدة من اثنين فقط فازوا بهذه الجائزة في مجالين مختلفين (الكيمياء والفيزياء).

ومن إنجازاتها وضع نظرية للنشاط الإشعاعي حيث ينسب إليها وضع مصطلح زنشاط إشعاعيس، كما ابتكرت تقنيات لفصل النظائر المشعة، ويرجع إليها الفضل في توجيه أنظار الباحثين إلى الاستخدامات الطبية للنظائر المشعة في علاج الأورام السرطانية.

في ٤ يوليو١٩٣٤ توفت ماري كوري بعد حياة علمية حافلة في مصحة بشرق فرنسا؛ حيث كانت تعالج من أنيميالانموية نجمت عن تعرضها لجرعات كبيرة جدا من الاشعاع في زمن لم تكن الآثار الضارة للإشعاع المؤين قد عرفت بعد، وبالتالي لم يكن العلماء الذين يتعاملون مع تلك العناصر على دراية باحتياطات السلامة اللازمة، فلطالما حملت مدام كوري أنابيب اختبار تحوي نظائر مشعة في جيبها، ولطالما وضعتها في درج مكتبها دون أن تدرك أخطارها الجسيمة. ونظراً لتأثر متعلقاتها الشخصية التي ترجع إلى تسعينيات القرن التاسع عشر بالإشعاع، فقد اعتبرت مواد شديدة الخطورة، وحتى كتاب الطهي الخاص بها كان مشعاً بدرجة كبيرة لدرجة أنه محفوظ مع تلك الأوراق في صناديق مبطنة بالرصاص، وتستدعي مطالعة هذه الأوراق ارتداء ملابس خاصة واقية من الإشعاع.

قالوا عنها :

ديمتري مندليف: "هذه الصغيرة سيكون لها اسم مرموق في دنيا الكيمياء"

أينشتاين: "إن ماري كوري من بين جميع المشهورين هي وحدها التي لم يفسدها المجد"

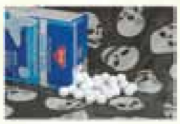
قالت: "تعلمت من حياتي أن الفقر لا يقف حائلاً ضد الطموح".

ذات يوم سُئلت عن أمنيتها فأجابت: (إني بحاجة إلى جرام من الراديوم، لكي أتابع أبحاثي. ولكني لا أملك ثمن هذا الجرام).

احذر كرات النفثالين

كثيرا ما نستخدم كرات النفثالين Molth Balls في دورات المياه وفي المغاسل بل ويضعها البعض في خزانات ملابسهم لحمايتها من العثه. ولكن هل خطر ببالك يوما أن هذه الكرات تشكل عاملا خطيرا جدا على الصحة كما أوردت الوكالة الدولية لأبحاث السرطان International Agency for Research on Cancer والتي تصنف النفثالين كمسرطن محتمل للبشر. ولكن ما هو النفثالين؟ وما استخداماته؟وما أضراره الصحية؟

النفثالين هيدروكربون أروماتي صلب أبيض متبلر، ويتكون الجزئ من حلقتي بنزين متحدتين مع بعضهما البعض وصيغته الكيميائية $C_{10}H_8$ وهو مركب يتسامى في درجة حرارة الغرفة ويكوّن بخار قابل للاشتعال. الأمر الذي يفسر اختفاء كرات النفثالين بعد فترة زمنية ما.



الأضرار الصحية للنفثالين: إن التعرض المستمر لأبخرة النفثالين يسبب تهيج للعين والجهاز التنفسي العلوي.واستنشاق كمية كبيرة يسبب صداع ودوخةوغثيان وقيء وإسهال والام بالبطن وارتفاع في درجة الحرارة.

وأفادت مستشفيات وجود نسبة مرتفعة من فقر الدم الانحلالي في حديثي الولادة والأطفال الصغار الذين كانوا يرتدون ملابس أو ملفوفين في بطاطين تم تخزينها في كرات النفثالين. أما بالنسبة للنساء الحوامل ، ينتقل النفثالين عبر مجرى الدم من الأم لجنينها. كما تم الكشف عن السمية في حليب الثدي ، ولكن ليس في الكميات التي يعتقد أنها مثيرة للقلق.

وتزداد خطورة هذه الكرات بالنسبة للأطفال؛ إذ غالبا ما يشبه شكلها شكل الحلوى والتي قد تكون مميتة إذا ابتلع الأطفال كميات كبيرة منها.

استخداماته : بعد ورود الكثير من التحذيرات حول كرات النفثالين بدأت الشركات المصنعة تضيفه إلى بخاخات الهواء بالإضافة الى مادة أخرى أكثر سمية يطلق عليها paradichlorobenzene (PDB) لذا انتبه جيدا عند شراء هذه المنتجات والأفضل الاستغناء عنها واستخدام مركبات طبيعية كبديل لها من ذلك أكياس الأعشاب والتي تجمع عددا من النباتات العطرية المجففة مثل الخزامى واللافندر والليمون والتي تتوافر بكثرة في العديد من المحلات التجارية.

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International Year of CHEMISTRY 2011

الكيمياء حياتنا .. الكيمياء مستقبلنا

المديرية العامة لتطوير المناهج

الإصدار الثاني اغسطس ٢٠١١م

كيمياء النانو (الجزء الأول)

في هذا الإصدار :

إعداد
زليخة بنت سعيد الحارثية
عضو مناهج تعليمية كيمياء
قسم تطوير مناهج العلوم
دائرة تطوير مناهج العلوم التطبيقية

تصميم وإخراج
عبدالمنعم المخيطي
مركز إنتاج الكتاب المدرسي والوسائل التعليمية

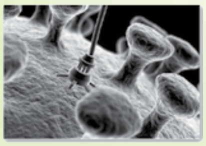
لم يكن أحد ليتصور أن يشاهد تلفازا ملونا قبل ١٩٥٠م وبالمثل لم يكن أحد ليتصور النقلة النوعية الحاصلة في الاتصالات من هواتف نقالة أو ساعات رقمية أو إنترنت، إن هذه النقلة أحدثها اكتشافا بسيطا توصل اليه العلماء يتمثل في المعالجات الدقيقة (microprocessor) وبالمثل يتوقع أن تنقل تقنية النانو البشرية من عهد الى آخر مختلف تماما. ولكن ما كيمياء النانو وما التقانات التي يتوقع أن تقوم عليها؟

لقد توصل العلماء أخيرا إلى اكتشاف مفاده أن المادة تبقى محتفظة بجميع خصائصها الفيزيائية على مختلف الأحجام فخصائص مكعب الذهب هي نفسها خصائص ذرة صغيرة من الذهب ولكن ما إن نصل الى حجم دقيق في حجم النانو (فالنانومتر هو واحد على المليار من المتر) حتى تتغير خصائصه الكيميائية والفيزيائية على حد سواء إذ يتغير لونه على سبيل المثال، فإذا أضيف الى ذلك إعادة ترتيب هذه الذرات في حجمها النانوي فإن سلوكها يتغير تغيّراً مذهلاً، إذ تبدأ الذرات بامتصاص الضوء و تحويله الى حرارة كافية لتصير مثل مشع حراري دقيق قادر على قتل خلايا غير مرغوب فيها في الجسم. وسبب هذا التغير يعود إلى طبيعة التفاعلات بين الذرات المكونة لعنصر الذهب، ففي الحجم الكبير من الذهب لا توجد هذه التفاعلات في الغالب، ونستنتج من ذلك أن الذهب ذو الحجم النانوي سيقوم بعمل مغاير عن الذهب ذي الحجم الكبير.

وهكذا فإن جميع المواد إذا صارت في حجم النانو وأعيد ترتيبها في هذا الحجم، تنتج خصائص ووظائف جديدة لم تكن متوقعة من قبل. فبعض المواد تصير أكثر قدرة على التوصيل الكهربائي والحراري وبعضها الآخر يصير أقوى أو يعكس الضوء على نحو أفضل أو يغّير لونه مع تغيّر حجمه. الأمر الذي يتيح مجالات من التطبيقات لم تكن ممكنة في الأحجام الأكبر.

جاء في مقال في جريدة الحياة اللندنية للكاتب (أحمد مغربي) تعرّف التقنية النانوية بأنها تطبيق علمي يتولى إنتاج الأشياء عبر تجميعها على المستوي الصغير من مكوناتها الأساسية، مثل الذرة والجزيئات. وما دامت كل المواد المكونة من ذرات مرتصفة وفق تركيب معين، فإننا نستطيع أن نستبدل ذرة عنصر ونرصف بدلها ذرة لعنصر آخر، وهكذا نستطيع صنع شيء جديد ومن أي شيء تقريبا. وأحيانا تفاجئنا تلك المواد بخصائص جديدة لم نكن نعرفها من قبل، مما يفتح مجالات جديدة لاستخدامها وتسخيرها لفائدة الإنسان.

وهكذا يتوقع العلماء إن إعادة ترتيب ذرات الفحم ستمكننا من الحصول على الماس. وإذا أعدنا ترتيب ذرات الرمل وأضفنا بعض العناصر الأخرى يمكننا الحصول على رقائق السيليكون .



يتوقع أن تتمكن تقنية النانو من زراعة روبوتات نانوية في جسم الانسان تسد العجز الذي قد يعتري بعض الأعضاء

إيرين كوري ... الولد سر أبيه

كثيرا ما يقال أن الولد سر أبيه، وها هي إيرين جوليو كوري إبنة الكيميائية الشهيرة مدام كوري تثبت أنها سر أمها وتثبت ما للتربية

ايرين كوري مع زوجها

والتعليم من أهمية في ترسيخ حب الكيمياء في قلوب الناشئة، إذ عملت الصغيرة منذ نعومة أظفارها في معهد والدتها زمعهد الراديوم أو المعروف حاليا بمعهد كوريس وفيه تعرفت إلى زوجها فريدريك جوليو.

لم تكد تمضي غير سنة واحدة على رحيل مدام كوري، حتى أُعلن عن منح ابنتها إيرين جوليو كوري جائزة نوبل في الكيمياء عام ١٩٣٥ والتي تقاسمتها مع زوجها جراء إثباتهما أن تعريض البورون بقوة لأشعة ألفا، ينتج نظيرًا مشعًا. وهكذا استطاعا تحضير أول نظير مشع من صنع الإنسان، مما قاد إلى إنتاج العناصر الاصطناعية المشعة. يعتبر اكتشافهما قفزة علمية في مجال الكيمياء النووية ودرجة أساسية من درجات السلم الذي أوصل العلماء إلى إحداث الانشطار النووي ومن ثم إلى تصنيع القنبلة الذرية. وعملت مع زوجها على مشروع القنبلة النووية الفرنسية. في سنة ١٩٣٧ أصبحت محاضرة وأخذت مكان زوجها في معهد فرنسا. في سنة ١٩٣٩ حصلت على اللقب الفخري زضابط الوسام الشرفيس. وأصبحت فيما بعد عضوا في لجنة الطاقة الذرية الفرنسية، وتحت توجيهات هذه المجموعة استطاعت فرنسا تشغيل أول مفاعل نووي عام ١٩٤٨م. وفي ١٧ مارس ١٩٥٦ توفت إيرين كوري في باريس بعد معاناة مريرة مع سرطان الدم بسبب تعرضها الكثيف للإشعاعات.

وهكذا ينتقل أثر التربية عبر شجرة العائلة لتكون هيلين لانجفان- إبنة إيرين وحفيدة ماري- عالمة فيزياء نووية.

هل فكرت يوما... ماذا تضع على وجهك؟ الجزء الأول

سمع جميعنا عن أخطار الأشعة وأضرارها التي تزيد بزيادة التعرض للأشعة، الأمر نفسه ينطبق على الكيماويات التي تشتمل عليها مواد التجميل ومنتجات العناية اليومية والتي يزيد ضررها بزيادة الاستهلاك. هل تساءلت يوما عن الكيماويات التي تعرض لها جسمك على مر العقود؟ لاشك أن استخدام الشامبو مرة واحدة في اليوم لا يمكن أن يصيبك بأي نوع من الأمراض ولكن ماذا عن استخدامه على مدى ستين عاما ؟

أثبتت العديد من الدراسات أن أغلب هذه المستحضرات تحتوي في الغالب على ثمانية من المركبات التي تعتبر الأكثر خطورة والمصنفة ضمن المواد المسرطنة، نتحدث في هذا الإصدار عن خمسة من هذه المركبات وهي:

Phathelates : وهي مركبات تستخرج من النفط وتستخدم في طلاء الأظافر وكريمات تصفيف الشعر، صنفته وكالة الحماية البيئية (Environmental Protection Agency) كمسرطن محتمل للبشر ولوحظ تشوه الأجنة الذكور الذين تعرضت أمهاتهم لنسبة عالية من هذه المادة، تجده في المستحضرات بالاختصارات التالية : "DHEP"، "BzBP"،"DMP"،"DEP"، "DBP" .

Parabens : يوجد في أنواع متعددة من المستحضرات ، وجد بنسب عالية جدا في أورام الثدي ، إحرص جيدا على قراءة المحتويات وتجنب تلك التي تحتوي على "methyl"،"ethyl" ،" propyl"، "butyl" parabens.

Talc : تستخدم بودرة التالك كثيرا للأطفال لوقايتهم من التهاب الحفاض ، أثبتت الدراسات علاقتها المباشرة بسرطان المبايض ، إذ أثبتت إحدى الدراسات المسحية أن ٣٣٪ من مستخدمات هذه البودرة تعرضت لخطر الإصابة بسرطان المبايض.

Fragrance : (المواد العطرية): تضاف المواد العطرية لكثير من المستحضرات ولاسيما الكريمات المرطبة ووسائل تنظيف الأيدي، تحتوي هذه المواد العطرية على ما يقارب ٢٠٠ مركب كيميائي وحسب تقرير نشر في ١٩٨٦م ، فإن ٩٩٪ من هذه المواد العطرية تشتمل على مركبات كيميائية مشتقة من البنزين بالإضافة إلى الألدهيدات وغيرها من المركبات التي ثبتت علاقتها بالسرطان. احرص دائما على انتقاء المستحضرات الخالية من العطور "Non- Fragrance" أو تلك التي تحتوي على زيوت طيارة "Essential Oils" .

Triclosan : بدأت أغلب الشركات بإضافة هذه المادة الكيميائية ، بإعتبار خصائصها المضادة للبكتيريا ، إلى سوائل التنظيف وبعض أنواع الصابون ومزيلات الروائح وكريمات الترطيب ومعاجين الأسنان وغيرها الكثير. على الرغم من أن الوكالة البيئية (EPA) سجلته كمبيد حشري باعتبار خطره على كل من الإنسان والبيئة. أثبتت الدراسات أن للترايكلوسان قابلية للتفاعل مع الكلور الموجود في ماء الصنبور لينتج عنه الكلوروفورم الذي له تأثيرات سامة على كل من القلب والكبد.

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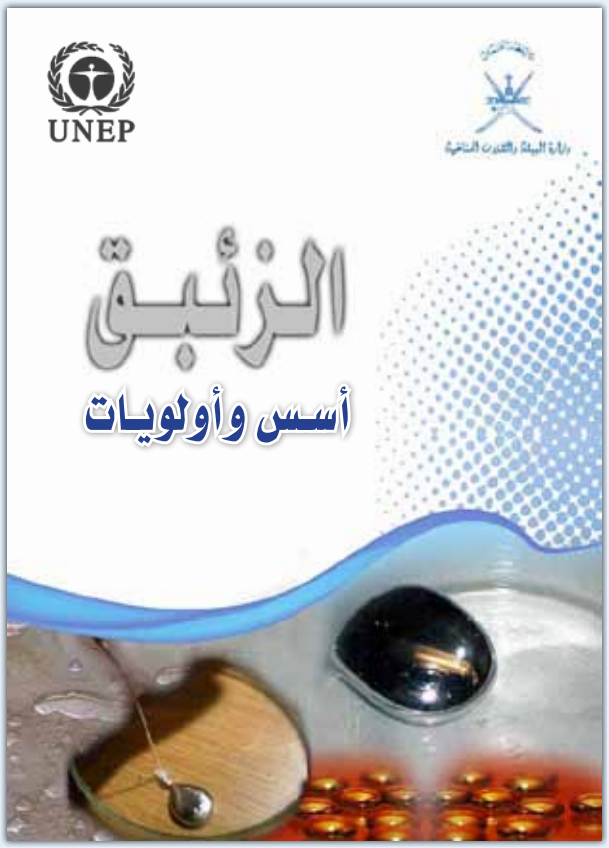


مُقدّمة

يعتبر الزئبق من المعادن الثقيلة وهو عبارة عن معدن فضي سائل متطايرحيث يتبخر في درجات حرارة منخفضة، ويعتبر بخار الزئبق عديم اللون والرائحة، وله القدره على الثباتية (عدم التحلل) في البيئية وقدرته على التراكم البيولوجي في الأنسجة الدهنية والعظام. وفي حالة انسكاب الزئبق على سطح الأرض يجب تنظيفه جيدا وبشكل سريع لأنه قد يترسب داخل الأرض. وقد ينتشر في الماء والهواء عن طريق أنشطة الإنسان مثل: التعدين، التصنيع، إزالة الغابات، ترميد المخلفات وحرق الوقود. ويتشتت إلى جسيمات صغيرة للغاية لمساحة كبيرة. ويتواجد الزئبق في صورتين (عضوي وغير عضوي) ويعتبر ميثيل الزئبق من أكثر مركباته العضوية سُمية.

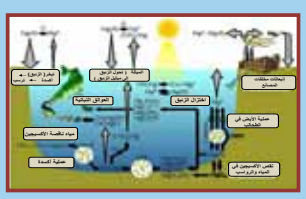
الوزن الذري : ٨٠ جم/مول

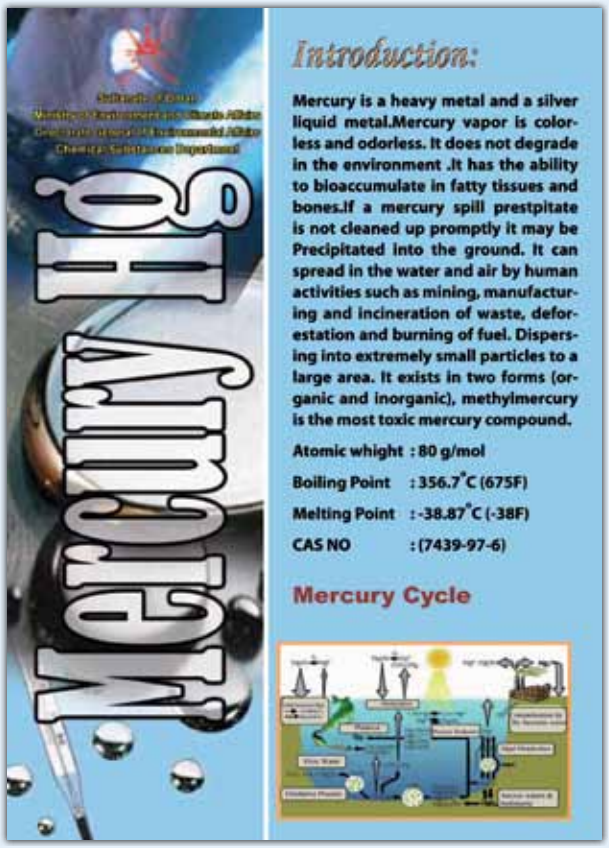
درجة الغليان : ٣٥٦.٧ مئوية (٦٧٥ فهرنهايت).

درجة الانصهار : -٣٨.٨٧ مئوية (-٣٨ فهرنهايت).

رقم التسجيل الكيميائي الدولي (CAS NO) : (٧٤٣٩-٩٧-٦)

دورة الزئبق






ملحق تصدره اللجنة الوطنية العمانية للتربية والثقافة والعلوم مع مجلة
تواصل
TAWASOL
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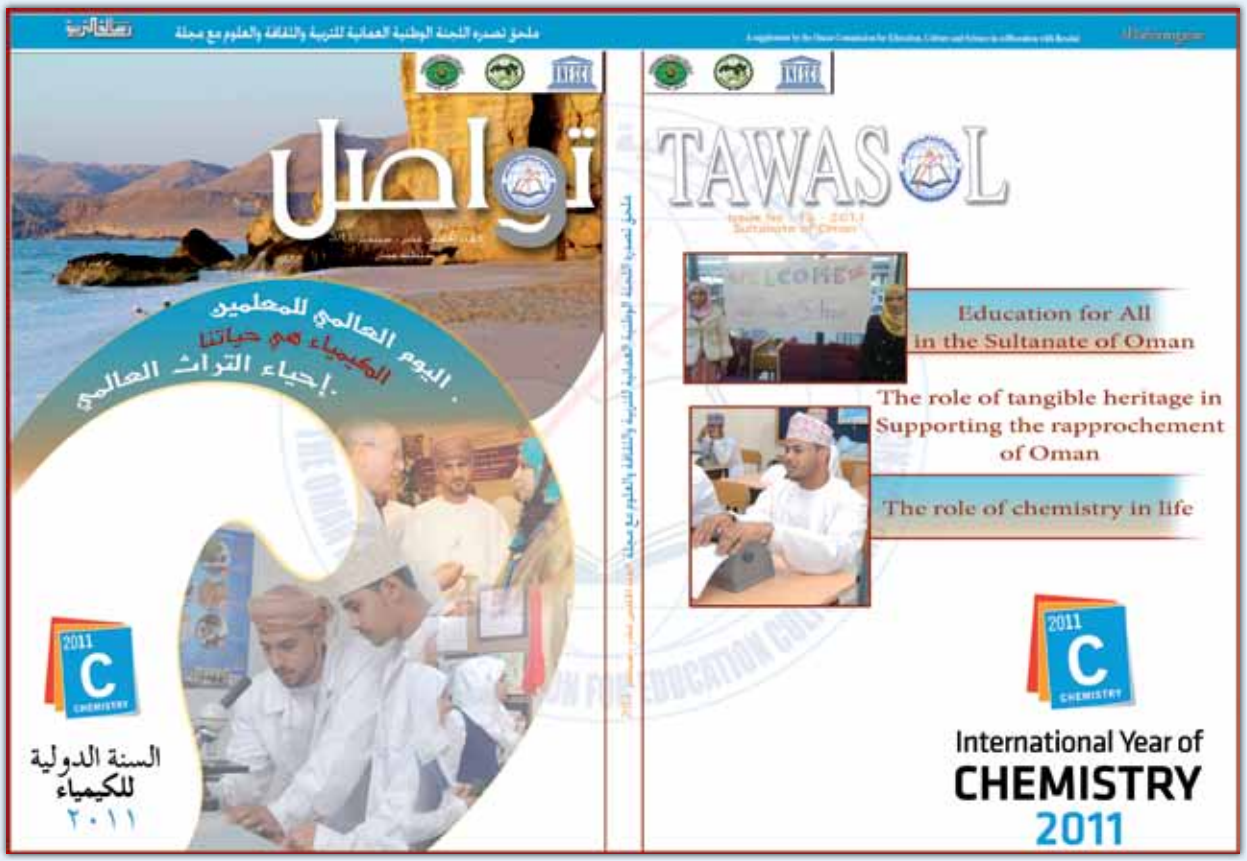
CHEMISTRY
2011
السنة الدولية
للكيمياء ٢٠١١
رحلة تواصل
الثقافات الخامسة
حديقة النباتات
والأشجار العمانية
لقاء مع المديرة العامة
لليونسكو
International Year of Chemistry 2011 (IYC)
5th Connecting Cultures Trip in Oman
Integrating the ESD concepts and topics in education plans and curricula
Oman Botanic Garden
Interview with:
Director General of the UN Educational, Scientific and Cultural Organization (UNESCO)
Conference on Education for Sustainable Development in support of Cultural Diversity & Biodiversity
Muscat 24-26 Jan 2011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الكيمياء في حياتنا
إحياء التراث العالمي
السنة الدولية
للكيمياء
٢٠١١
Education for All
in the Sultanate of Oman
The role of tangible heritage in Supporting the rapprochement of Oman
The role of chemistry in life
International Year of
CHEMISTRY
2011


دورة الزئبق في البيئة
International Year of CHEMISTRY 2011
السنة الدولية للكيمياء ٢٠١١
المديرية العامة للشؤون البيئية
دائرة المواد الكيميائية
يتطلق الزئبق من الثورات البركانية على شكل أكسيد الزئبق نتيجة لدرجة الحرارة العالية
HgO
يعود الزئبق إلى الأرض على شكل دقائق وجسيمات الزئبق
يترسب الزئبق إلى القاع وحواف البرك والأنهار والسدود نظراً لكثافته العالية مقارنة بالماء
(حيوان، إنسان، طيور) ← أسماك كبيرة ← أسماك صغيرة
العوالق الحيوانية
مثل الزئبق ← العوالق النباتية
السلسلة الغذائية بتراكم مثيل الزئبق أحيائياً فتزداد السمية
تسرب مخلفات مواد كيميائية منها الزئبق من المصانع إلى البيئة المحيطة مثل ما حدث في اليابان في ميناماتا سنة 1956
حرق الغابات والمحاصيل تطلق الزئبق للغلاف الجوي
Hg + عنصرية
CH3 Hg
مثيل الزئبق
في الطبقة الرسوبية يتحول الزئبق إلى مثيل الزئبق نتيجة لوجود البكتيريا
الطبقة الرسوبية (القعر الرسوبي)
يوجد الزئبق في التربة طبيعياً بنسبة ضئيلة جداً ويزداد بالترسيب من الجو أو المخلفات ويتحد مع بعض العناصر ليكون أملاح الزئبق والتي هي أكثر سمية من الزئبق المعدني. ويتم امتصاص أملاح الزئبق في المحاصيل الزراعية التي يتغذى عليها الإنسان.
(N) مادة ضارة بالبيئة
(T) مادة سامة وقاتلة بالجرعات الكبيرة
(T+) مادة سامة وقاتلة بالجرعات الصغيرة
مادة مهيجة للجلد والجهاز التنفسي...الخ


وزارة البيئة والشؤون المائية


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الكيمياء... حياتنا... ومستقبلنا


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Lead Poisoning

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