



# CHARTERED CHEMIST NEWS

Newsletter of the Association of the Chemical Profession of Ontario

Winter 2011  
Vol. 11, No. 3

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an insurance provider to bring group rate E&O Insurance to our members, a national Mutual Recognition Agreement (MRA) for transferability of our members across Canada, a national definition of the Practice of Professional Chemistry as well as continued support for our Provincial Associations. I expect to be able to provide additional updates on these initiatives before year's end.

As I announced in our last issue the ACPO moved forward with Phase I of our plan for Licensure. I am pleased now to announce that the ACPO is moving forward with the second phase. Over the next 12 months the ACPO will be working diligently to have legislation introduced and passed in the coming legislature that would allow the profession to obtain licensure for its members. We will be lobbying elected officials and public servants, drafting legislation and seeking support from our stakeholders. You will witness many of the initiatives happening very quickly within the next few months starting with this CCN edition. Please take time to review the ACPO message to its members. This will outline our initiative and steps to be taken including the role of all members of the ACPO

Stay tuned, stay informed and stay active as we work to achieve our ultimate goal of Licensure.

*Chris Sullivan,  
C.Chem.  
President*

## President's Message

As autumn fast approaches we generally look forward to the colourful display that accompanies it. This year we also witnessed another colourful display with respect to our Provincial election. While the official colour remains pretty much the same the landscape is vastly different both in geography and intensity. I congratulate all of our elected MPPs on their success and challenge them to work together diligently for the continued success of Ontario.

As the Provincial Government chose to reduce their cabinet representation your ACPO Council worked hard to add new members. I would like to welcome two new representatives. Shuhuan Li has joined as your councillor for District 9 (Wellington/Waterloo) and Hemant Patel has joined as your

councillor for District 11 (Sarnia). If you are within these districts please take the time to welcome them as your representative and feel free to contact them with any questions you may have. All contact information is available on our website.

Over the last few years you have been informed of the ACPO participating in the National Advisory Committee for Professional Chemistry in Canada (NACPCC).

This committee has now evolved into a formal Standing Committee under the title Canada's Professional Chemists (CPC). Canada's Professional Chemists/Chimistes professionnels du Canada (CPC) is a national organization consisting of provincial organizations of professional chemists and the Canadian Society for Chemistry. Its mandate is to advance the Profession of Chemist in Canada. Some of the projects this committee is currently working on include a national agreement with

Be sure to visit our website at: [acpo.on.ca](http://acpo.on.ca)

# Letter from the Editor



Hello Chartered Chemists from Ontario and around the globe. I hope that you all are enjoying the Canada's winter and waiting for the New Year and spring. It is my great pleasure to introduce you the 2011 last issue of the Chartered Chemist News (CCN) and hope you will enjoy the reading of this issue at your warm home in this cold winter. I am also very glad to inform you that the ACPO Council Members will continue working hard even in this cold winter. We'll have the Council Meetings on November 2011 and January 2012 and all council members are committed to work hard for the ACPO. I am very glad to have an opportunity to work with such dedicated team and also as the Editor-in-Chief of the CCN. I also want to request you to help the CCN and the ACPO by submitting good quality articles for our newsletter. We need high quality articles for CCN in chemical sciences from all of you. It is very crucial for the ACPO to maintain the

high standard of its newsletter. Therefore, high quality articles from you are very important. Please submit your articles for the next CCN Issues at [editor@acpo.on.ca](mailto:editor@acpo.on.ca) and/or [scmojumdar@yahoo.com](mailto:scmojumdar@yahoo.com). We accept the articles from all fields of chemical sciences. We publish the articles submitted to the CCN as first come first serve basis after a positive review by the CCN Editorial Board. ACPO has always been committed to public safety. It is also my great pleasure to inform you that ACPO is going to request the government and the opposition parties to grant licensure to our profession. Therefore, a message from ACPO to its Members also has been included in this CCN issue. I also want to take this opportunity to wish all of you a Very Happy and Prosperous New Year 2012.

*Subhash Mojumdar,  
Ph.D., C. Chem  
Editor-in-Chief*

## Bridging Program

"In an effort to reduce the systemic barriers faced by internationally educated professionals attempting to enter the Canadian knowledge economy the ACPO is investing extended efforts in creating a Bridging Program.

A part of this endeavour is the Career Map for Internationally Trained Chemists. The Association of the Chemical profession of Ontario has partnered with Ontario Government to create a career map for internationally trained chemists. Career maps explain in detail every step of the registration process in ACPO, including language requirements, industry trends, labour market conditions, credential

assessment process and other important information.

Skilled immigrants bring with them higher education, valuable skills and work experience. The integration of immigrants into the Canadian labour market is an essential component for the success of Ontario economy. However, many factors restrict the access to adequate employment for skilled immigrants, such as a lack of foreign credential recognition, lack of Canadian work experience and knowledge or lack of proficiency in English. ACPO has a unique and central role in reducing these barriers.

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**Winter 2011**

# Bridging Program con't

The Career Map for Internationally Trained Chemists is offering answers to many of the legitimate questions that an internationally trained chemist will ask when immigrating to Ontario. The information is actually accessible even before immigration which offers an extra chance to the professional chemists to prepare themselves for the big transition of changing the country of residence.

Professional integration is one of the keys in a successful personal social inclusion in multicultural Canada. Social inclusion of newcomers to Canada should be

the realization of full and equal participation in the economic, social, cultural and political dimensions of life in their new country. It is our belief that the Career Map for Internationally Trained Chemists is going to be an important tool to integrate internationally educated professionals into the Canadian professional labour market.

You can find the Career Map for Internationally Trained Chemists on the Ontario Ministry of Citizenship and Immigration website under Global Experience Ontario at [http://www.ontarioimmigration.ca/en/working/OI\\_HOW\\_WORK\\_CHEMIST](http://www.ontarioimmigration.ca/en/working/OI_HOW_WORK_CHEMIST_CM.html)

[\\_CM.html](#)

If you have any questions about the Career Map or its content please contact us at [info@acpo.on.ca](mailto:info@acpo.on.ca) or at [lcretu.acpo@gmail.com](mailto:lcretu.acpo@gmail.com). Also you are invited to send suggestions of what a successful Bridging Program should offer or to share with us your personal story about your professional integration into the chemical profession in Canada.

Liliana Cretu  
District Councilor, ACPO"



## The National Occupational Classification (NOC) Code: 2112 Chemists

The National Occupational Classification (NOC) is the authoritative resource on occupational information in Canada. It is used daily by thousands of people to understand the jobs found throughout Canada's labour market.

Chemists conduct research and analysis in support of industrial operations, product and process development, quality control, environmental control, medical diagnosis and treatment, biotechnology and other applications. They also conduct theoretical, experimental and applied research into basic chemical and biochemical processes to create or synthesize new products and processes. Chemists are employed in research, development and quality control laboratories; chemical, petrochemical and pharmaceutical industries;

mineral, metal and pulp and paper industries as well as in a wide variety of manufacturing, utility, health, educational and government establishments.

### Example Titles

agricultural chemist  
analytical chemist  
biochemist  
chemist  
clinical chemist  
coatings chemist  
electrochemist  
environmental chemist  
food chemist  
inorganic chemist  
nuclear magnetic resonance (NMR) spectroscopist  
oceanographic chemist  
organic chemist  
organic mass spectrometrists  
organometallic chemist  
pharmacological chemist  
physical chemist  
polymer chemist  
quality control chemist

research chemist  
soil chemist  
textile chemist  
theoretical chemist

### Main Duties

*Chemists perform some or all of the following duties:*

- Analyze, synthesize, purify, modify and characterize chemical or biochemical compounds
- Develop and conduct programs of analysis to ensure quality control of raw materials, chemical intermediates or final products
- Conduct programs of sample and data collection and analysis to identify and quantify environmental toxicants
- Conduct research to develop new chemical formulations and processes and devise new technical applications of industrial chemicals and compounds

# The National Occupational Classification (NOC) Code: 2112 Chemists *con't*

## Employment Requirements

- A bachelor's degree in chemistry, biochemistry or in a related discipline is required.
- A master's or doctoral degree is usually required for employment as a research chemist.
- Licensing by a provincial association of chemists is compulsory in Quebec, and available but voluntary in Ontario and Alberta.

## Additional Information

- Mobility between occupations in this group is possible with experience.
- Mobility is possible to occupations concerned with plant management, technical sales and the development and management of regulatory programs and teaching professions.

## Classified Elsewhere

- *Chemical Engineers* (2134)
- *Geochemists* (in 2113 *Geologists, Geochemists and Geophysicists*)
- *Metallurgists and material scientists* (in 2115 *Other Professional Occupations in Physical Sciences*)
- *Molecular biologists* (in 2121 *Biologists and Related Scientists*)



## 22<sup>nd</sup> CTAS Annual Workshop and Exhibition

Canadian Thermal Analysis Society (CTAS) will be holding its 22<sup>nd</sup> Annual Workshop and Exhibition on May 08-09, 2012 at the Stage West Hotel, Mississauga, Ontario, Canada.

The two-day CTAS Workshop and Exhibition will start with a one-day training session, followed by one-day technical session with oral and poster presentations. Instrument exhibitions will occur on both days.

There will be a special issue of the *Journal of Thermal Analysis and Calorimetry (JTAC)*, dedicated to the 22<sup>nd</sup> CTAS Annual Workshop and Exhibition and the full papers will be published after a positive review. CTAS invites you to present a paper and/or poster in this Workshop and submit the full papers to JTAC Associate Editor, Dr. Subhash Mojumdar ([scmojumdar@yahoo.com](mailto:scmojumdar@yahoo.com)). The subject matter may cover any aspect of thermal analysis techniques, hyphenated techniques and applications to various materials.

To recognize the contribution by students to the field of thermal

analysis, two awards will be presented to the student giving the best poster (\$50) and oral (\$200) presentations at the Workshop.

This occasion is an excellent opportunity to meet other thermal analysts and exhibitors, and to learn new applications in thermal analysis. Please show your support to the Canadian thermal analysis community by attending, presenting a paper and/or exhibiting your instruments in the Workshop and Exhibition.

Please visit [www.ctas.org](http://www.ctas.org) and/or contact Subhash Mojumdar for more information. Please your abstracts to Shanti Singh ([shanti.singh@nrcan.gc.ca](mailto:shanti.singh@nrcan.gc.ca) or fax 613-995-1230), and your registration/membership and/or exhibition reservation form to Pierre-Claver Nkinamubanzi ([Pierre-Claver.Nkinamubanzi@nrc-cnrc.gc.ca](mailto:Pierre-Claver.Nkinamubanzi@nrc-cnrc.gc.ca) or fax 613-954-5984). I am sure that my colleagues Shanti, Holger and Pierre will do their best to answer all your queries. However, do not hesitate to contact me if I could help you anyway.

I look forward to meeting you at the **22<sup>nd</sup> CTAS Annual Workshop & Exhibition.**

Sincerely,  
Subhash Mojumdar  
CTAS Acting President



**Let us welcome our NEW MEMBERS processed by the board as of January 2011**

Erik Peterson  
Horace Faulknor  
Alex Doiron  
Geoffrey Sanchez  
Vesna Mircevska  
Hermant Kumar Patel  
Naishadh Kumar Pate\*  
Liudmila Nakonecinaia  
Dr. Shuhuan Li  
Laura A. Benninger  
Dr. Stephen G. Urquhart  
Rachel E. Bryan  
Dr. Benetode Konziase  
Nicole Millette  
Gunamuni Nuwan Hallowita  
Mariame Sakanoko  
Rebecca L. Gilmore  
Yacine Merabtine

# ACPO Message to its Members

The recent Ontario provincial election has returned the provincial Liberals to power. Premier McGuinty has what has been called by media a “major minority.” This makes it likely that this government will be stable for the foreseeable future.

This situation offers opportunities for the Association of the Chemical Profession of Ontario. ACPO's efforts prior to the election indicate that this is the right time and that we have the right political climate to have the government and opposition parties support licensure for Ontario chemists.

Our Association has always been committed to increased standards in professional practice for chemists in Ontario. Our Association has always been committed to public safety. That is why we have always been

committed to licensure for Ontario chemists.

Licensure for Ontario chemists will usher in a new era. From greater opportunities for our members to increased public safety, this project is a win-win: for Ontarians and for chemists.

For the past few years, our members have requested that we move forward with licensure for our profession. We're pleased to announce that, after having gathered all the necessary pieces of the puzzle (support from our members, information on the need, resources, political support), ACPO will be asking the government and the opposition parties to introduce and adopt a bill giving licensure to our profession. This “second phase” of our efforts should lead to significant developments, including the drafting of a bill and the introduction of this bill in Ontario's legislature.

## We will need you.

We will, in the near future, be asking you to help us. Helping us will mean:

- Participating in surveys to help us confirm the level of support from our members
- Responding quickly to any communication we may send you requesting your feedback
- Helping us identify organizations that could support us in our efforts (write letters of support, etc.)
- Liaising with your local MPP to tell him or her how important this is for you

*Our combined efforts will make this project a success. This is the right time.*



## **Association of the Chemical Profession of Ontario** **Association des chimistes professionnels de l'Ontario** **Chartered Chemist Member volunteer interest survey**

*If you are available to help out the ACPO council please provide us with the following information:*

Name: \_\_\_\_\_

ACPO member #: \_\_\_\_\_ Email address: \_\_\_\_\_

Area of volunteer interest: \_\_\_\_\_

Details: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

# Readers Write Nitinol: Shape Memory Alloys

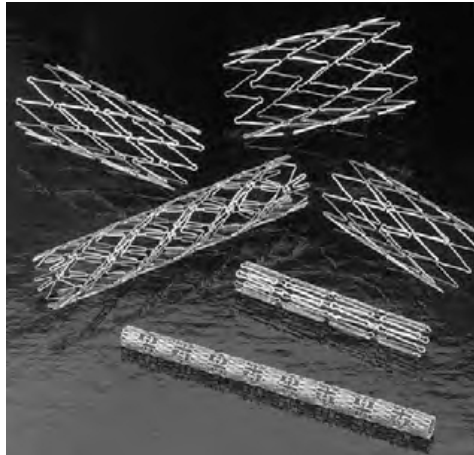
Shape Memory Alloys (SMAs) are materials that “remember” their original shapes. The examples of various SMAs are Nickel-Titanium alloys, copper-aluminum-nickel, copper-zinc-aluminum and iron-manganese-silicon alloys.

Nickel-Titanium alloys have been found most useful among all the SMAs. Nickel-Titanium alloys are named “Nitinol”. The name is derived combining the names of the components Nickel, Titanium and the place of invention i.e. Naval Ordnance Laboratory, Maryland, U.S.A. The actual invention of Nitinol is an example of Serendipity, i.e. invention occurred accidentally. At a laboratory management meeting Nitinol was presented that was bent out of shape many times and one of the members Dr. David Muzzey heated it and surprisingly the strip stretched back to its original form.

Nitinols are composed of generally ~55 % of Nickel and ~45% of Titanium. The physical characteristics of Nitinols vary as the ratio of these two metals varies. Nitinol alloys exhibit two closely related and unique properties: shape memory and superelasticity. Shape memory refers to the ability of Nitinol to undergo deformation at one temperature, then recover its original shape upon heating above its “transformation temperature”. Superelasticity occurs at a narrow temperature range just above its transformation temperature; in this case, no heating is necessary to cause the undeformed shape to recover and the material exhibits enormous elasticity about 20-30 times that of ordinary metal.

The useful properties of Nitinol alloys other than superelasticity and thermal shape memory are biomechanical compatibility, constancy of stress and dynamic interference along with their

strength and fatigue resistance allow them to be used for designing superior medical devices.



*Stents fabricated of Nitinols  
(Ref. Article, Memry Corporation, USA )*

Nitinol is being used in a variety of applications. They have been used for military, medical, safety, and robotics applications.

Many of the current applications of Nitinol have been in the field of medicine; Tweezers to remove foreign objects through small incisions were invented by NASA. Orthodontic wires made out of Nitinol reduce the need to retighten and adjust the wire. These wires also accelerate tooth motion as they revert to their original shapes. Nitinol eyeglass frames can be bent totally out of shape and return to their parent shape upon warming. Nitinol needle wire localizers “used to locate and mark breast tumours so that subsequent surgery can be more exact and less invasive” utilize the metal's shape memory property. Another successful medical application is Nitinol's use as a guide for catheters through blood vessels.

There are examples of SMAs used in safety devices which will save lives in the future. Anti-scalding devices and fire-sprinklers utilizing SMAs are already on the market.

The anti-scalding valves can be used in water faucets and shower heads. After a certain temperature, the device automatically shuts off the water flow. The main advantage of Nitinol-based fire sprinklers is the decrease in response time.

Other miscellaneous applications of shape memory alloys include use in household appliances, in clothing, and in structures. A deep fryer utilizes the thermal sensitivity by lowering the basket into the oil at the correct temperature.

The many uses and applications of shape memory alloys ensure a bright future for these metals. Research is currently carried out at many robotics departments and materials science departments. With the innovative ideas for applications of SMAs and the number of products on the market using SMAs continually growing, advances in the field of shape memory alloys for use in many different fields of study seem very promising.

**ACPO assumes no responsibility regarding the accuracy and contents of this article. The author is the solely responsible for the contents and accuracy of the article. If you have any question regarding this article, please contact directly to:**

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[hemant\\_chem@yahoo.ca](mailto:hemant_chem@yahoo.ca)*

*Phone: 519-491-1790*



# Milestones of Canadian Chemistry

**The 80-plus milestones of Canadian chemistry listed below are only some of the contributions made by chemists in Canada since 1900.**

## 1990s

Science and Technology of Social Insect Pheromones (Slessor)  
Enhanced Oil Recovery With Surfactant-Stabilized Foams (Schramm)  
Free Radical Polymerization Process (Georges, Xerox Research Centre)  
Natural Product Chemistry and Ecology of Cold-Water Organisms (Andersen)  
Morphologies of Nanometre-Sized Block Copolymer Aggregates (Eisenberg)  
Photochemical Metal Organic Deposition (Hill)

## 1980s

Intermetallic Crystallographic Database (NRC)  
Discovery of the "Distonic" Ion Structure in the Gas Phase (Holmes)  
A Carbohydrate Odyssey: From Sucrose and Coupling Constants to Blood Determinants (Lemieux)  
Development of Visudyne (Dolphin)  
A Machine for Making Genes (Ogilvie)  
The Antiviral Drug Ganciclovir (Ogilvie)  
C-H Bond Activation of Saturated Hydrocarbons by Soluble Transition Metal Complexes (Graham)  
Carbohydrate Chemistry and Meningitis Vaccine (Jennings)  
The Steam Tables and the Structure of Ice (Whalley and Kell)  
The World's Only X-Ray Diffraction Structure of a Three-Membered Bromium Ion (Brown)  
Responsible Care: A New Ethic for the Chemical Industry (CCPA)  
Microwave-Assisted Chemistry (Laurentian University / Queen's University)  
The Emergence of Density-Functional Theory as a Computational Tool in Chemistry (Becke and Ziegler)  
NRCVAX Crystal Structure Analysis System (NRC)  
The Discovery of 3TC and the Growth of BioChem Pharma (Belleau)  
Directed Ortho Metalation Reaction: A Powerful Industrial Synthetic Technology (Snieckus)  
On Line Oil Sands Analysis by Near Infra Red

## 1970s

Discovery of Cyanopolyacetylene in the Interstellar Medium (Kroto and McLeod)  
Stable Isotope Tracing of Pollutant Sulphur (Krouse)  
Atoms in Molecules – A Quantum Theory (Bader)  
Mass Spectroscopy of Canola Oil (Craig and Downey)  
Fourier Transfer Ion Cyclotron Resonance Spectroscopy (Comisarow and Marshall)  
The Fractional Calculus of Keith B. Oldham  
The Discovery of Anthroquinone Pulping (Holton)  
Fingerprint Detection with Lasers (Duff and Menzel)  
The Discovery of the Trisulfur Trinitrate Anion S<sub>3</sub>N<sub>3</sub><sup>-</sup> (Bojes and Chivers)  
Aerobic Methylation of Arsenic by Microorganisms (Cullen)  
The Development of Site-Directed Mutagenesis (Smith)  
Organic Synthesis for Medicinal Chemistry and the "Chiron" Approach (Hanessian)

## 1960s

Quantifying Free Radical Chemistry (Ingold)  
Role of Passive Oxide Films in Governing Corrosion Processes (Cohen)  
Homogenous Catalysis Based on Ruthenium and Rhodium Chemistry (James)  
Xenon Hexafluoroplatinate(V) Xe+[PtF<sub>6</sub>]<sup>-</sup>: The Discovery of Noble Gas Reactivity (Bartlett)  
Temperature Programmed Desorption: A Fundamental Tool in Catalysis (Amenomiya, Cvetanovic)  
Discovery of the First Dinitrogen Complex (Allen and Senoff)  
Theory of Higher-Order Effects In Vibration-Rotation Spectra of Semi-Rigid Molecules (Watson)  
Photodegradable Plastics (Guillet)  
The Discovery of the Agricultural Fungicide "Carbathiin" (Kulka)  
Canada's Brimstone Milestone

## 1950s

Pioneering Work in Alkaloid Chemistry (Manske)  
Ammonia Pressure Leaching Process for Nickel (Forward et al; Sherritt Gordon)  
University Research in Chemistry in the 1950s (Lemieux, McDowell, Gunning)  
Spectra of Various Gas-Phase Polyatomic Free Radicals (Herzberg)  
Mass Spectrometry of Free Radicals (Lossing)  
Radioactive Tracers in the Study of Natural Product Biosynthesis (Marion)  
The Anomeric (Edward-Lemieux) Effect  
The Synthesis of Complex Porphyrins (MacDonald)  
Gaseous Action Dynamics Studied by Infra-Red Chemiluminescence (Polanyi)  
High Resolution Nuclear Magnetic Resonance (Pople, Schneider and Bernstein)  
Superacids in Main-Group Chemistry, and the VSEPR Model of Molecular Structure (Gillespie)  
Total Syntheses of Diterpene Alkaloids (Wiesner)  
The Synthesis of Coenzyme A (Moffatt, Khorana)  
Kinetic Isotope Effect Applications to Reaction Mechanisms (Bourns)

## 1940s

RDX: A High Explosive for World War II  
The Pidgeon Process in Magnesium Production  
Polymer Corporation Synthetic Rubber Plant, Sarnia 1942-3 (Whitby and Rowzee)  
Mass Spectrometer Investigations of Isotopes Produced in Nuclear Fission (Thode)  
Manufacture of Chlorine Dioxide for Bleaching Pulp (Rapson)  
Post-War Research on Radioisotope Applications (Spinks)  
E. W. R. Steacie and the NRC Post-Doctoral Fellowship Program  
Stable Isotope Geochemistry (Thode)

## 1930s

Vanillin from Pulp Mill Waste (Tomlinson)  
Development of Fractionating Columns and More (Stedman)  
Processing with Finely Divided Solids: Suspensoid Cracking (Stratford, Imperial Oil)  
Herzberg Monographs on Molecular Spectroscopy

## 1920s

Solving the Prairie Concrete Problem (Thorvaldson)  
Clarification of Kraft Green Liquor: Bathurst Pulp Mill, 1920s (Bates)  
Vinyl Resins at Shawinigan (Skirrow, Morrison, Blaikie)  
Hot Water Separation Process For the Athabasca Oil Sands (Clark)  
Insulin (Collip)

## 1910s

The First Commercial Production of TNT in Canada (LeSueur)  
The First Canadian Toluene  
Acetone for World War I by the Carbide-Acetylene Route (Canadian Electro Products, later Shawinigan Chemicals)

## 1900s

The Nature of Radioactivity (Rutherford and Soddy)  
Innovations in Lead and Zinc Processing by Cominco, 1900-1930



# Membership Requirements



## A) Categories

There are three categories of membership available for the ACPO:

### 1) **Full Member of the ACPO:**

These are individuals who have satisfied the formal requirements of the Association and are eligible to call themselves Chartered Chemists and to use the abbreviation C. Chem. after their names;

### 2) **Associate of the ACPO:**

These are individuals who are working as chemists, or in chemistry-related fields, and are in the process of fulfilling the formal requirements for membership;

### 3) **Affiliate of the ACPO:**

These are student members currently studying chemistry, biochemistry or chemical engineering in an accredited university program.

## B) Qualifications/Requirements

Individuals who possess the following academic qualifications or training and experience may be admitted as members:

1) An Honours undergraduate **degree**, or its equivalent from an accredited university program in Chemistry, Chemical Engineering, or the Chemical Sciences plus **two years** of work experience acceptable to the Association. Post Graduate training will be credited as equivalent to work experience.

2) Other academic qualifications, e.g. a three-year undergraduate degree with a major in Chemistry, extensive work experience (minimum **5 years**), and a record of professional competence in the chemical field as evidenced by publications or patents.

3) Individuals who have at least **six years** of acceptable experience in the chemical field, but who do not possess the above academic qualifications, may qualify for membership by passing the Graduate Record Examination, Chemistry Section.

4) In special cases, the Board of Examiners may present individuals to the Council for consideration based on their exceptional contributions to the science of chemistry as recognized by their peers.



### **Chartered Chemist News**

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