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Let's create the future of Chemistry

2019 is a very unique year for chemistry and chemists because a large number of events and concerted actions related to chemistry are occurring. Indeed, this month in Paris, the IUPAC 2019 Congress and the joint 50th General Assembly will present a unique event as both will celebrate the Centenary of the International Union of Pure and Applied Chemistry (IUPAC). It was conceived in Paris, elaborated in London and signed in Brussels in 1919. Moreover, 2019 is an exceptional year for chemistry because the United Nations General Assembly proclaimed it as the International Year of the Periodic Table of the Elements established by Dmitri Mendeleev in 1869.

Chemistry is an exceptional discipline, a science that is playful for anyone who appreciates it! To be a little provocative, we will say that everything is chemistry: ourselves and our environment! Chemistry is a central discipline that nourishes, functionally intellectually and economically, both humanity and the academic and industrial worlds. Research in chemistry is at the frontiers with all disciplines (biology, mathematics, physics, engineering, environmental sciences,

etc.) and covers both fundamental research, essential for the understanding of phenomena, and also research oriented towards industrial innovation. Our aim as chemists is to make chemistry better known as a science and also as an industry, and to show the unwavering links that they maintain and try to arouse vocations among the youngest.

Chemistry is indeed a source of inspiration, integration and evolution. There are "real challenges" behind the understanding of chemical processes and the production of new molecules, materials and systems. One of the major challenges in which chemists are involved concerns the reasoned development of bio-sourced or bio-inspired new molecules, materials and systems, with multi-functional structures able to respond to the societal and environmental demands needed for our well-being. These strategies, integrating inorganic and organic chemistries, supramolecular chemistry, physical chemistry in a broad sense with all their components, modeling and process engineering, are at the base of a strong current of research and new



school of thought that are giving birth to a so-called "integrative" chemistry. In this context, today chemistry is a real cornucopia fueled by the creativity of chemists. Health (drugs, implants and prostheses, medical imaging, therapeutic vectors), cosmetics, textiles, packaging, construction, insulation, automotive, functional coatings, high technologies (micro-optics, and microelectronics), energy (solar, wind, hydraulic, nuclear, batteries, fuel cells...) are great examples. In addition, environmental sciences are already benefiting from the development of new materials in areas such as sensors, catalysis, purification, separation...

Even if technological and economic impact of chemistry are very important for our society, blue sky research should also be strongly supported because risky long-term research will allow to make non expected real progress. Risk taking is an essential part of research activity. *"The unpredictable is in the very nature of the scientific enterprise. If what we are going to find is really new, then it is by definition something unknown in advance"* (François Jacob, French biologist, 1920-2013).

Because of its centrality, chemistry is at the heart of major societal and environmental concerns, to which academic, industrial and public decision makers respond jointly. The stakes in terms of health, energy, depletion of the resource and the impact of anthropic activities on the ecosystem pose legitimate questions for the citizen. The teaching of chemistry, as of all other fields of experimental sciences, contributes to the development of the knowledge and the critical spirit of the

citizens. Both will improve the science-society dialogue because it makes sense if our opinions are built, not exclusively on emotional reactions, but on established knowledge.

The programme of the 2019 IUPAC Centenary Congress, with the theme *"Frontiers in chemistry: Let's create our future!"*, was built to merge the different fields of chemistry and to address today's most challenging issues.

2019 IUPAC meeting is composed of thirty symposia. Three main themes are forming the backbone of the Congress: Chemistry and Life, Chemistry and Energy, Chemistry and Environment.

Last but not least, the WCLM (World Chemistry Leadership Meeting) symposium is for the first time devoted to a special session during which the Presidents or CEOs of the largest chemical companies or users of chemistry will exchange their visions, perspectives, and approaches of the UN sustainability goals challenges.

The Centenary conjunction represents a unique opportunity to project the universality values of IUPAC, and it is worth remembering that the Union welcomes as well the scientists from pure academic research as those involved in applied and industrial aspects.

This special issue of *L'Actualité Chimique* illustrates through selected articles written by highly recognized scientists the main challenges of a very beautiful and useful science: CHEMISTRY.

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