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Chemistry's understated majesty

The International Year of Chemistry is under way. Chemists should celebrate their discipline's past as the foundation of other fields, and face the future with increasing confidence.

"Chemistry can be a good and bad thing," said US comedian Adam Sandler. "Chemistry is good when you make love with it. Chemistry is bad when you make crack with it."

The plentiful good points of chemistry are to be promoted to the public this year. Under the official United Nations banner of the International Year of Chemistry, chemists across the world are to join hands to celebrate their subject. Why 2011? Formally, it is to mark the 100th anniversary of Marie Curie receiving the Nobel Prize in Chemistry, for her discovery of radium and polonium. Informally, chemists are no doubt keen for their time in the sun. Last year was the Year of Biodiversity and 2009 was the Year of Astronomy. The International Polar Year stretched from 2007 into 2008, and 2005 was the Year of Physics. Chemistry's time has surely come — it is 350 years, after all, since Robert Boyle published *The Sceptical Chymist* and put the discipline firmly on the modern scientific map (see page 30).

It is regrettable for chemistry's champions that its iconic figures have to be shared with other disciplines. In the English-speaking world, Boyle is perhaps most commonly associated with his law relating the pressure and volume of a gas, and so with physics. And he is not the only shared standard bearer. Even the organizers of this year's chemistry extravaganza are trading on the reputation of someone whose fame relies heavily on her fatal fascination with radioactivity, for which Curie was awarded the 1903 Nobel Prize in Physics.

This situation is even more acute in modern research. Chemistry is often central, with principles and discoveries that enable work in other subjects. Its ability to react and rearrange matter for applications such as energy storage, new materials and more efficient industrial processes is vital for modern technology. Yet often, other disciplines such as materials science emerge as the public faces of such successes.

UNSUNG HEROES

Nature drew attention to this syndrome in 2001 (*Nature* 411, 399; 2001). The "lack of an accurate and identifiable chemistry 'brand' means that the discipline is easily misunderstood", we wrote, "and those working in it are frequently under-appreciated". A decade on, this has become a popular cause for those who seek to promote the benefits of the chemical sciences. The organizers of this year's celebration, for example, want to "improve the understanding and appreciation of chemistry by the public" and "promote the role of chemistry in contributing to solutions to global challenges".

There is no question that chemistry's important advances often lack the widespread recognition they deserve. What can be done to change this? Although chemists are right to stress that their work underpins much of modern science, those foundations are rarely acclaimed. But perhaps chemistry has less a problem of public image than a lack of desire to assert itself. For beneath the utilitarian way that chemistry feeds into other disciplines, it has a rare and wonderful majesty on its own terms. Perhaps this is satisfaction enough for many. Witness this

week's issue of *Nature*: alongside varied perspectives about chemistry and its future (see page 23), we publish three important papers across the field, in supramolecular chemistry, organic chemistry and biochemistry (see pages 72, 76 and 116). And as the year unfolds, we intend to publish more outstanding research from the molecular sciences, as well as a series of reviews on some of the most compelling topics in the field.

Nevertheless, as science funding becomes more competitive and is judged on visible results, the organizers of the chemistry year are right to seek credit where it is due. Perhaps the spotlight will shift towards chemists as boundaries between fields continue to blur. As biologists, for

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instance, zoom in on the action of molecules to probe physiological and cellular processes, including how cells communicate, they are effectively working as chemists — albeit chemists who work with oversized molecules.

There are other ways to boost the profile of chemistry. In biology papers, and many synthetic-chemistry papers, key basic-chemistry references — descriptions of synthesis and characterization of individual compounds — are often relegated to supplementary information, where they can languish unnoticed and uncredited. Chemists often grumble that citation analysis should be changed to account for this.

GLOBAL REACH

One important function of the year of chemistry will be to bring to light hidden contributions to science and society at large. Certainly, there is no shortage of global problems to which chemists can contribute solutions, such as the search for clean energy. And the Royal Society of Chemistry in London claims that some 20% of Britain's gross domestic product is already down to the work of chemists.

Chemistry is a mature field, but its exciting, productive and influential days are far from over. In the past few years alone, *Nature* has published cutting-edge research from chemists across the discipline. Some have probed the properties of the emerging material graphene (see page 14) and experimented with the new tool of DNA nanotechnology to design and assemble molecular machinery. Others have published details of new and improved materials for energy-storage devices. Organic chemists have shown how complex molecules can be made without the need for the sheltering protective groups commonly used to shield fragile molecules from decomposition during reactions. And the use of gold nanoparticles in oxidation reactions has revealed fundamental details of catalysis — the engine of much of chemistry and of life — and bolstered the wider work of chemists who strive to develop cleaner and less polluting industrial processes (see page 18).

If chemistry can truly be both good and bad, as Sandler observed, then much the same can be said for all the sciences, as for all human endeavour. But when chemistry is good, it is very, very good. It deserves its celebration. ■