

- 52 M. A. Monge, P. Goya, J. Elguero, «The Chemistry of the 21st Century—State of the Art», *Chem. Int.*, **2008**, 20, 24-66.

### The Chemistry of the 21st Century—State of the Art

by M<sup>a</sup> Angeles Monge, Pilar Goya, and José Elguero

Seventy-five years ago, a historic 11-day meeting was held (9–20 August 1933) by IUPAC officials to prepare for the XI General Assembly and the IX IUPAC Congress, which would take place in Madrid from 5 to 11 April 1934. This preparatory meeting was held in the Magdalena Palace at the Universidad Internacional de verano de Santander, Spain. To commemorate the event, a meeting was held from 23 to 25 July 2008 at the same venue under the title: 75th Anniversary of the Chemistry International Meeting: The Chemistry of the 21st Century—State of the Art. Solvay sponsored the meeting in celebration of the 100th anniversary of its factory in Torrelavega, Spain. About 60 people attended the meeting including students and professors.



Participants in the 1933 meeting. From left to right. Seated: Fritz Haber (Nobel Prize 1918), Richard Willstätter (Nobel Prize 1915), Hans von Euler-Chelpin (Nobel Prize 1929), Einar Biilmann (IUPAC president), E. Cohen, Nicola Parravano, Camille Matignon, E. Hauser, and Fritz Fichter. First row: Mrs. Cohen, Mrs. Ribas, Mrs. Seidel, Mrs. del Campo, Mrs. Calvet, George Barger, Mrs. del Fresno, Jean Gérard (IUPAC secretary general), Paulo E. de Berrédo Carneiro. Second row: Fernando Calvet, Angel del Campo Cerdán, Augusto Pérez Vitoria, Enrique Moles, Carlos del Fresno, Antonio Madinaveitia, Ignacio Ribas, and Atherton Seidell.

After the official opening ceremony by Salvador Ordoñez, rector of the Universidad Internacional Menéndez Pelayo (UIMP), there was a short introductory lecture by José Elguero on the historical circumstances surrounding the 1933 meeting and its participants—among them, three Nobel Prize winners. Next, IUPAC Vice President Nicole Moreau summarized IUPAC's role in a chemical world.



Participants in the 2008 meeting. From left to right. Seated: IUPAC Secretary General David StC. Black, Avelino Corma, Angeles Monge, Nicole J. Moreau, Jean-Marie Lehn (Nobel Prize 1987), and José Elguero. First row: Ernesto Carmona, Avelina Corma, Luis A. Oro, Pilar Goya, a student, Immaculada Ortíz Uribe, M<sup>a</sup> Teresa Martínez Fernández, Vicente Fornés, and Miguel Yus. Second row: a student, José C. Gómez Sal, Nazario Martín, and Manuel Yáñez. Top row, starting third from the left: Pilar Gómez Sal, Maribel Arriortua, Pascual Román, Berta Gómez-Lor (secretary of the meeting), Fernando Lahoz, Enrique Gutiérrez Puebla, and Marta Iglesias. Below them are Ana Platero, Natalia Snejko, M<sup>a</sup> Teresa García López, Esther Domínguez, José Vicente Heras, Esther Lete, Carmen Nájera, and Mercedes Cano.

Avelino Corma gave a lecture on “Molecular Design of Catalysts: From Basic Research to Industrial Applications” in which he described his research on molecular sieves with pores of different sizes that are used as heterogeneous catalysts. He also spoke about supported gold catalysts. This allowed the audience to understand his new concepts about the molecular design of solid acid-base (both Lewis and Brønsted) and redox catalysts that have created new possibilities in the field of fine chemistry.

Participants in the 2008 meeting (L to R). Seated: IUPAC Secretary General David StC. Black, Avelino Corma, Angeles Monge, Nicole J. Moreau, Jean-Marie Lehn (Nobel Prize 1987), and José Elguero. First row: Ernesto Carmona, Avelino Corma, Luis A. Oro, Pilar Goya, a student, Immaculada Ortíz Uribe, M<sup>a</sup> Teresa Martínez Fernández, Vicente Fornés, and Miguel Yus.

The first full day of the conference began with an opening lecture by Jean-Marie Lehn on “Perspectives in Chemistry: From Molecular to Supramolecular to Constitutional Dynamic Chemistry.” As expected, his lecture was full of new points of view about where the frontier of chemistry is. The notion of dynamers (or dynamic polymers) was introduced and the great possibilities open to chemists was thoroughly explained. This was followed by a presentation by Luis Antonio Oro (University of Zaragoza) on “Chemistry, Environment, and Sustainable

Development.” An extremely clear exposition of the problems and the chemical solutions to these problems followed. Next, Immaculada Ortiz Uribe discussed the important topic of “Great Challenges of Chemical Engineering in the 21st Century: Water Quality.” She described how industry can contribute to sustainable development, the technologies for transforming waste water into drinking water, and the research carried out in her department at the University of Cantabria.

The afternoon session comprised two lectures. The first, by Carmen Nájera, was entitled “Recoverable Catalysts for Asymmetric Synthesis.” Her detailed talk summarized the abundant research carried out at the University of Alicante and stressed the importance of chiral drugs. The second lecture, by Martín Martínez Ripoll on “Macromolecules, Crystals, and X-Rays,” was an enthusiastic defense of the extraordinary past and promising future of crystallography for the study of biomolecules.

On the final day of the conference, attendees heard from Ernesto Carmona on “Simple and Multiple Bonds between Metal Atoms: Some Recent Developments.” For those who believe that the notion of bond is the most important in general chemistry, Carmona not only presented his outstanding discovery of Zn-Zn bonds, but also covered other related metal-metal bonds from the literature. Pilar Goya lectured on “The Iatrochemistry of the 21st Century: Drug Design,” covering historic and recent aspects of drug design including the results obtained at the Institute of Medicinal Chemistry. The closing lecture on “Carbon Nanotubes and Their Applications in Biotechnology” was delivered by M<sup>a</sup> Teresa Martínez Fernández.

The meeting ended with a lively panel discussion among David Black, Nazario Martín (president of the Spanish Royal Society of Chemistry), and Otilia Mó (general director of Programs and Transfer of Knowledge in the Spanish Ministry of Science and Innovation).

#### Notes

1. It is worth remembering that Solvay played an important role in the creation of the International Association of Chemical Societies (IACS) that led to the creation of IUPAC.

M<sup>a</sup> Angeles Monge <amonge@icmm.csic.es> is a professor in the Institute of Material Sciences of the C.S.I.C. She is Vice-President of the “Menéndez Pelayo” International University (U.I.M.P., Santander, Spain). Pilar Goya <pgoya@iqm.csic.es> is the Head of the Institute of Medicinal Chemistry of the C.S.I.C. She is Vice President of the Spanish Royal Society of Chemistry (R.S.E.Q). José Elguero <iqmbe17@iqm.csic.es> is an Emeritus professor in the Institute of Medicinal Chemistry of the C.S.I.C. He is President of the Spanish Forum “Chemistry and Society.”