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Pascual Royo_Biosketch

Biosketch for Professor Pascual Royo.

It is a great honour and privilege for me to present here this biographical account of Professor Pascual Royo, teacher, mentor, leader and friend in this special issue of the Journal of Organometallic Chemistry that is dedicated "In Memoriam". Some Biosketches of Professor Royo have been previously reported [1–3].

Professor Royo was born in Zaragoza on January 2, 1938. Other references show his date of birth as January 12, 1938. At this time, Spain was mired in a bloody civil war. The discrepancy in dates may be due to difficulties in accessing the civil registry. In this way, the registration of the birth may not have occurred until January 12, 1938. After a life entirely dedicated to academe and his family, Professor Royo died on July 18, 2018 in Madrid, at the age of 80. For all of us who have enjoyed his company during our scientific career, we have lost an outstanding scientist and inspiring teacher, as well as a dear friend. For his closest family, their dearest husband, father and grandfather has been lost.

He studied chemistry at the University of Zaragoza, obtaining his bachelor's degree in 1961. After graduation, he worked for two years in "Industrias Químicas del Ebro", a company that was founded in 1958 in Zaragoza for the manufacture of silicate derivatives to be used as supplies in the detergent industry.

However, Professor Royo's true vocation and mission was University, so he returned there to cultivate his natural research and teaching talent. He moved to the University of Oviedo, where he began his doctoral thesis under the supervision of Professor Rafael Usón, his former professor at the University of Zaragoza, studying new contributions to the chemistry of $TiCl_4$ and $TiOCl_2$. In the University of Oviedo he held the position of Assistant Professor of Practical Classes, returning to the University of Zaragoza in 1967 to obtain his doctor's degree at this University in 1967. Then he was promoted to Associate Professor.

At the beginning of 1968, he joined the research group of Professor Ronald S. Nyholm at the William Ramsay and Ralph Forster Laboratory at University College London, where he was Honorary Research Assistant during 1968 and 1969.

Rafael Usón, one of the most productive and well-recognized inorganic chemists in Spain during the second part of the 20th century, and Ronald Nyholm, who played a leading role in the revival of current chemistry, were two seminal influences in the incipient but promising scientific career of Professor Royo.

Prof. Royo returned to the University of Zaragoza in 1969, being promoted in 1972 to Full Professor of Inorganic Chemistry, when he was only 34 years old, moving then to the Faculty of Sciences of Badajoz, (University of Sevilla), where he worked until 1974. Later, he held the position of full Professor of Inorganic Chemistry at the University of Murcia from 1974 to 1978.

Professor Royo took the Chair of Inorganic Chemistry of the University of Alcalá in April 1978, where he worked until 2011 (since 2009 as Professor Emeritus). The University of Alcalá, one of the oldest universities in Europe, was founded in 1499, by the Regent of Spain, Cardinal Cisneros, as an innovative educational project in his time, although from 1293 Alcalá de Henares was an academic institution specialising in general studies sanctioned by King Sancho IV. Following the Spanish "Confiscation" (the government's forced expropriation of land from the church and municipalities in the 19th century), the University of Alcalá was transferred to Madrid starting around 1836 (the current Universidad Complutense, in Madrid, derives from Complutum, the Latin name of Alcalá de Henares). Overcrowding at the universities of Madrid, along with the support of the citizens of Alcalá de Henares and the prestige of their old University, made it possible for the University of Alcalá to reopen its classrooms in 1977. Professor Royo came to Alcalá with an inclination for permanence and working to establish this new University. From the beginning he created a favourable environment in which to develop his University project that would combine excellent teaching and vigorous research. During the re-establishment of the University of Alcalá, Professor Royo played a very important role in building the national and international prestige that this University currently has, particularly in its Faculty of Sciences. He aimed at generating a University focused on furthering Science and educational development of people, by combining both teaching and research. With his going, the University of Alcalá loses one of its most distinguished members in recent history, with whom it will always be in debt.

From his published scientific papers, we can differentiate two fundamental phases of the research that allowed him to reach national and international prestige; the study of the synthesis, structural characterization and chemical behaviour of perhaloderivatives of block d and p elements, and the study of the synthesis,

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structural characterization and chemical behaviour of cyclopentadienyl derivatives of the first groups of the d-block metals.

During his stay at University College London, his initial research was based on the studies of the chemical reactivity of an excellent reagent previously synthesized by Professor Ronald S. Nyholm, (bromine pentafluorophenyl thallium (III)) as an oxidizing and transmetalation agent that allowed the preparation of new organometallic complexes of the d-block elements. Upon his return to the University of Zaragoza, together with Professor Usón, he extended the studies with the pentafluorophenyl ligand to the synthesis, characterization and study of the chemical behaviour of Au, Pd, Pt, Rh, Ir, Ni or Co, As, Sb or Bi complexes. Some of these studies were the base of the doctoral theses of students such as Juan Forniés, Antonio Laguna and José Gimeno. The pentafluorophenyl ligand became the logo of the chemistry developed in Zaragoza, where the study of perhalocomplexes of d-block elements continues to be a relevant topic in the Inorganic Chemistry laboratories. One of the seeds for the growth of Organometallic Chemistry in Spain was sown, highlighting, also, in this work Prof. Víctor Riera, an Oviedo disciple of Prof. Usón.

Whilst working in the Faculty of Sciences of Badajoz and the University of Murcia, Professor Royo expanded his research into other topics related to the chemistry of d-block metals, such as the coordination chemistry of covalent halides, derivatives in low oxidation states or carbonyl complexes.

Professor Royo was a vital stimulus in the development of the University of Alcalá at the time of his rebirth, since he started to build the scientific infrastructure that any university should have. With his arrival at the University of Alcalá, Professor Royo changed his line of research, shifting his scientific interest from the right to the left-hand side of the periodic table, undertaking studies focused on cyclopentadienyl derivatives of groups 4–6 metals. The challenge was to study the Organometallic Chemistry of the first transition metal groups and the chemical behaviour exhibited by these electropositive metals. This line of research has been the most prominent in his scientific career.

Pursuing this idea, the results obtained in this field of research, through the application of new methods and technologies of study, have been many and of high scientific value, covering the synthesis and characterization of new complexes and the study of their applications in processes of academic and industrial interest. The use of substituted and unsubstituted cyclopentadienyl ligands allowed him to prepare, stabilize, characterize and study the chemical behaviour of organometallic complexes of group 4, 5 and 6 metals, some in unusual oxidation states, studying the electron and steric influence that this type of ligand exerts on the properties of the metallic centre. He studied the applications of these derivatives as catalysts in the hydrogenation and polymerization of olefins, synthesizing neutral and cationic model complexes for these processes. The studies of C-H activation and insertion reactions allowed him to prepare the first titanium alkylidyne complex and to observe novel C-C coupling processes of great interest. Several research groups led by students of Professor Royo continue in university and industrial laboratories, maintaining scientific work in this line of research. Some of the results achieved in the University research laboratories generated industrial interests, so the University-company collaborations started by him were fruitful, highlighting those with the REPSOL Company.

His outstanding scientific profile was complemented by his excellent teaching abilities and his very committed devotion to the academic-teacher role. He raised the teaching method as a personal challenge to bring Inorganic Chemistry to the students in the most accessible and easiest way possible. He was a pioneer in the development of a personal Inorganic Chemistry teaching model, based on the use of the basic concepts of chemistry to rationalize the bond's nature, the structural behaviour and the reactivity of chemical substances, replacing the simple memorization of facts as a learning goal. He taught, in an accessible way, how to interpret and assimilate facts and concepts, making several generations of students come to appreciate Inorganic Chemistry.

It is not possible to understand Professor Royo's teaching without considering his zeal for research. The design of the teaching in which Professor Royo was so involved was intimately related to his research work and the contents of his scientific work. This particular way of teaching Inorganic Chemistry and investigative Organometallic Chemistry, together with his scientific and human magnetism, attracted numerous students and postdocs to his laboratory, many emerging with a real scientific vocation, developing both academic rigour and the ability to collaborate to achieve the best results. Those who wanted to join Professor Royo's group found the doors open on condition of a can-do attitude demonstrating seriousness, rigor and endeavour. He always maintained close relationships with his co-workers, cultivating the scientific discussions and contributing new ideas for the scientific and personal development of his team.

One way to assess the contribution that a teacher has made to the academic-scientific development of a specific human environment, in this case university, is to analyse his capacity as mentor and leader to generate true scholars. A very large number of the researchers and students trained by him are currently leader researchers in Spain and abroad, in academia or industry. Through this way of understanding and exercising teaching and research, he facilitated the scientific education of many students, encouraging and promoting, in addition, the development of these students as people.

The number of journal articles and books he published, research works he supervised, and other academic contributions he did is very high. He received highly prestigious national and international honours, highlighting the Humboldt Prize in 1991 (the first Spanish inorganic chemist to receive this distinction) and the RSEQ Award in 1999. Professor Royo was the founder in 1980 of the Specialized Group of Organometallic Chemistry (GEQO), within the RSEQ, of which he was the first President until 1988.

The set of characteristics that define Professor Royo, delineated above, allow us to classify him as one of the most important recent Spanish scientists in our field, who to a large extent laid the foundations of what Organometallic Chemistry is today in Spain. With his passing, people from different scientific specialties highlighted his qualities and his legacy for the future. He has been defined as an exemplary person in his scientific research and his academic dedication to the University. He rose with determination to every challenge before him. He was a demanding and indefatigable worker with a high sense of rigor.

On a personal level, two of the most outstanding qualities cultivated throughout his personal life were his honesty and humanity. Honesty manifested in all his efforts to obtain means, equipment and facilities that would benefit the entirety of the scientific-academic community close to him, rather than simply working for himself. His constant desire was to contribute to change and improve the University as an institution, to better develop Science in general and Chemistry in particular. His humanity was reflected daily in many ways through the personal relationships he maintained with all his students and co-workers. He had many close friendships with renowned Spanish and foreign scientists.

Professor Royo married Pilar Cantabrana in 1962, a primary school teacher from La Rioja, to form a close marriage with shared compassion, mutual respect and love. The humanity of Professor Royo was also reflected in this family environment. The Royo-Cantabrana family was our family. His house was our house. Hospitality in their homes in Badajoz, Murcia or Alcalá de Henares made

all of their students and co-workers enjoy many moments of conviviality. The meetings that he organized in his house were meetings that generated trust and integration. From this marriage, four daughters were born, Ana, Beatriz, Eva and María who were entrusted with expanding the family, a successful endeavour that has produced seven grandchildren and a great grandson so far. Beatriz and Eva have continued the trajectory of their father having become two excellent organometallic chemists.

These lines outline the profile of a distinguished scientific-academic figure, the contribution of Prof. Royo in research and teaching, but primarily I would like to stress his deep generosity and humanitarian dimension. A remarkable human and harmonious intellectual, with a fascinating and contagious ability to enjoy life, in all its aspects. There are many of us who had the opportunity to live, learn and enjoy alongside him. We wish to express our respect and admiration for the figure of Professor Royo as proof of our deepest gratitude for what he meant and will mean. He has left, but he will always be among us since we will constantly remember him.

References

[1] T. Cuenca, J. Vicente, Preface: Pascual Royo, a life devoted to the university, J. Organomet. Chem. 663 (2002) 1–3.
[2] T. Cuenca, Obituario Pascual Royo (1938-2018), An. Quim. 114 (3) (2018) 196–197.
[3] T. Cuenca, Obituary Pascual Royo, Chem. Eng. News (2018) 37. November 26.

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