



Obituary

In memoriam Jerzy Haber (1930–2010)



Professor Jerzy Haber, an outstanding scientist, Leader and Tutor of many generations of Polish chemists, a remarkable organiser of research, died on January 1, 2010. He was an internationally acclaimed specialist in solid state chemistry, catalysis and surface phenomena who created and directed for many years the Institute of Catalysis and Surface Chemistry of Polish Academy of Sciences in Krakow.

Jerzy Haber was born on May 7, 1930 in Krakow and was linked with this city for his entire professional and private life. Here, in 1951, he graduated in chemistry from the Faculty of Mathematics, Physics and Chemistry of the Jagiellonian University. After graduation, he took a position of research assistant at the AGH University of Technology in Krakow, working on physico-chemical properties of transition metal oxides in the research group of Professor Adam Bielański. In his research, he demonstrated a correlation between changes in their electron properties and catalytic activity [1]. This was one of the first experimental confirmations in the world of the electron theory of catalysis. His doctoral thesis 'A relationship between the electric conductivity of a working catalyst and its catalytic activity', accomplished at the age of 26, concerned the same subject.

In 1960–1961, he stayed as a postdoctoral fellow at the University of Bristol, where he undertook with Professor F.S. Stone what was at that time a pioneering research project on the interpretation of photoadsorption and photocatalysis on the basis of the

crystal field theory, the results of which are still quoted regularly in textbooks and monographs [2].

On his return to Poland, he continued his work at the AGH University of Technology until 1968, first as a research fellow and then as an associate professor. He was an excellent lecturer. His lectures on physical chemistry attracted crowds of students from various departments of the university.

In 1968, he was appointed director of an independent Laboratory of Catalysis and Surface Chemistry of Polish Academy of Sciences (since 1978, the Institute). The Institute was Jerzy Haber's life accomplishment. He masterminded the concept of creating a platform for a mutual exchange of ideas and research in the entire area of the physical chemistry of gas–solid, gas–liquid and solid–solid interfaces. He stood behind the spectacular development of the Institute which started in a few rented premises with 28 members of staff, including just 5 in catalysis *sensu stricto*, and attained during 30 years its own impressive building, unique research equipment and almost 100 members of staff, including 15 professors and associated professors, specialising in diverse aspects of catalysis, surface chemistry and colloids. In spite of difficult times in a politically divided Europe, the Institute has become an element in the international research network, a place of free flow of ideas, open to contacts with the entire world, a true centre of excellence in its area.

At the Institute, Jerzy Haber initiated and developed broad research, both fundamental and applied, in diverse areas of heterogeneous and homogeneous catalysis, as well as solid state chemistry applied to catalysis. In particular, his research concerned oxide systems—catalysts of the selective oxidation processes, as well as zeolites, catalysts based on organo-metallic complexes, and catalysts used in the environmental protection, to mention just the most important research directions.

The investigations have led to the formulation of a theory of catalytic oxidation of hydrocarbons and have introduced into the world literature the concept of electrophilic and nucleophilic oxidation. The classification revealed a correlation between the catalytic properties of transition metal oxides and their structure, and has become a foundation of the science-based selection of the catalysts. Professor Haber demonstrated that the ability of oxides of transition metals of groups V–VII to add selectively oxygen atoms to the hydrocarbon chain of an organic molecule is linked with the phenomenon of crystal shearing. Investigations of single-crystal oxide catalysts have led to a general conclusion that the consecutive elementary steps of the catalytic reaction may proceed on different crystal faces (structure-sensitive reactions).

Jerzy Haber was the first in the world to initiate research on the description of elementary steps of the reaction of catalytic

oxidation of hydrocarbons using quantum chemical methods. These revealed that the reaction path depends on the orientation of the reacting molecules with respect to one another and to the catalyst surface which undergoes restructuring.

Investigations on the homogenous reactions of hydrocarbon oxidation with the participation of transition metal porphyrins as model catalysts allowed him to reveal the role of the electron structure of transition metal ions as active centres for these reactions, and to formulate the mechanism of initiation of the chain reactions and the chain development step.

Jerzy Haber was actively committed to organising research in Poland, for example by coordinating the national research programme in catalysis. Since 1971 he was full professor in chemical sciences, since 1973 a corresponding member and since 1983 a full member of the Polish Academy of Sciences, since 1990 a member of the Presidium of the Academy, President of the Krakow Branch of the Academy since 2003, a full member of the Polish Academy of Arts and Sciences since 1991, the director of its Class of Mathematics, Physics and Chemistry, 1999–2008, a founding member of the Polish Club of Catalysis and its President, 1992–2007, a member of Research Council to the President of the Republic, 1991–1995, a member of the Central Commission for Research Degrees, 1975–1981 and 2000–2006, and a member of the National Council of Environmental Protection, 1991–2002. For his research and administrative activity, he was awarded among others a doctorate *honoris causa* by the Marie Curie-Skłodowska University in Lublin, the Research Prize of the Prime Minister, the Commander Cross with Star of the Order of Polonia Restituta.

Excellent erudition, organisational talents, fluency in several languages, friendly attitude to all, and finally, ease in establishing contacts and social skills, made Jerzy Haber a valued member of many international bodies and a popular lecturer. He held a number of functions in international institutions and organisations, among others: President of the International Committee of Reactivity of Solids, 1976–1984; Vice-President of the Commission on Colloid and Surface Chemistry Including Catalysis, IUPAC, 1977–1987; President of the Subcommittee of Catalysts Characterization, IUPAC, 1978–1990; President of the International Council of Catalysis, 1988–1992; and Vice-President of the European Federation of Catalysis Societies, 1997–1999. The French Chemical Society awarded him the Pierre et Marie Curie Prize and the German Society of Chemical Engineering and Biotechnology, the Alwin Mittasch medal. He was doctor *honoris causa* of the Université Pierre et Marie Curie in Paris and a member of the Academia Europea and of the

National Academy of Science of Ukraine. He received the Order of the Academic Palms of the French Republic.

Jerzy Haber was widely acclaimed in Poland and worldwide as author of scientific papers: he published nearly 530 original papers and 6 books, received more than 50 patents, and presented 115 plenary and invited lectures at international congresses. He supervised 30 doctoral projects and was member of editorial boards of many scientific journals, including the most important ones for his research area: Journal of Catalysis (1976–1982), Catalysis Reviews, Science and Engineering (1976–1985), Reaction Kinetics and Catalysis Letters (to 1976), Journal of Chemical Technology and Biotechnology (since 1979), Polish Journal of Applied Chemistry (since 1979), Revue de Chimie Minerale/European Journal of Solid State Chemistry/Solid State Sciences (since 1980), Applied Catalysis (1981–1984), Bulletin of the Polish Academy of Sciences, Chemical Series (1981–2004), Reactivity of Solids (1985–1990), Catalysis Letters (since 1987), Bulletin des Sociétés Chimiques Belges (1991–1997), Polish Journal of Chemistry (1992–1996) and Comptes Rendus de l'Académie de Sciences, Paris (since 1998).

Citizen of the world, invited to congresses and meetings in all corners of the globe, visiting professor of universities in Belgium, France, Japan and Canada, he remained during all his life closely linked to his native Poland and to the city of Krakow. Enthusiastic connoisseur of art and historic monuments, he initiated at his Institute modern research on the deterioration mechanisms and protection of historic objects and supported the activities of the Council of Environmental Protection in Krakow. He was a regular concert- and art-exhibition goer. From his travels all over the world, he returned to his beautiful house in Krakow, the garden, dogs, exquisite library, collection of prints and maps, with a professional collection of views of his city. He was a charming host of social meetings, possessing a rare talent for listening to others. He is survived by his wife Hanna, an architect and art-lover, a constant companion in all his undertakings.

Written by friends,
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References

- [1] A. Bielański, J. Dereń, J. Haber, *Nature* 179 (1957) 668.
- [2] J. Haber, F.S. Stone, *Trans. Faraday Soc.* 59 (1963) 19.

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