



Prof. Dr. Boris Žemva

In honour of Professor Boris Žemva, on the occasion of his receiving the Zois Award for lifetime achievements in the field of inorganic fluorine chemistry

In November 2011, Prof. Boris Žemva received the highest scientific award in Slovenia, the Zois Award, for his lifetime achievements in the field of inorganic fluorine chemistry. The Zois Award is conferred on researchers who have excelled in their scientific, research and development activities during their careers. As a result, the Editorial Board of Acta Chimica Slovenica decided that one issue of the journal should be dedicated to him to commemorate this occasion. So it was with great pleasure that we accepted the invitation to edit this special issue.

From the official written statement of the award we extracted one part: "Prof. Dr. Boris Žemva belongs, with his research achievements in the field of inorganic fluorine chemistry – especially the chemistry of noble gases, high-energy oxidizers and coordination compounds with unusual ligands – among the few researchers in the world who have really advanced the knowledge in these areas over the past forty years to an unprecedented extent."

Allow us to highlight Prof. Žemva's career in more detail. Boris Žemva was educated at the University of Ljubljana, Faculty of Chemistry and Chemical Technology, where he received his PhD in chemistry in 1971. The research work for his PhD thesis was carried out at the Jožef Stefan Institute in the research group led by prof. Jože Slivnik. A large part of the research in the department at that time was devoted to noble-gas chemistry, which was rapidly expanding during this period. In 1962, for example, Prof. Neil Bartlett discovered the first noble-gas compound XePtF_6 , and the research group at the Department of Fluorine Chemistry at the Jožef Stefan Institute was among the very few groups in the world that had the experience and necessary equipment to immediately be part of this exciting new field of chemistry. Boris Žemva joined the Slivnik group in 1965 and he quickly became involved in this research area. His PhD thesis was devoted to an investigation of the reactions between xenon and flu-

orine under pressure. He received a Fulbright Travel Grant in 1972 and started his post-doctoral study at the University of California, Berkeley, USA, with prof. Neil Bartlett. This was the start of both a fruitful collaboration and a long-lasting friendship.

Noble-gas chemistry remained his main research interest in the following years. Studies of the preparation of XeF_5^+ salts with metals in higher oxidation states using KrF_2 as an oxidant, XeF_6 as a moderately strong base and anhydrous hydrogen fluoride as a solvent are particular landmarks.

In 1983 Boris Žemva became head of the Department of Fluorine chemistry, which later became the Department of Inorganic Chemistry and Technology in 1992. Since then the activities of the department have not focused solely on fluorine chemistry, but also on other fields involving the synthesis of new inorganic materials with special properties. Many of the activities of the department under his leadership have been devoted to technological, ecological and safety problems in Slovenia as well as to education in the area of chemistry. Prof. Žemva has actively participated in and supported all of these activities, dealing not only with the fundamentals, but also with applied research. Several applied projects were successfully completed at the department during this time. One of the most important, and a personal favourite of his, was a multi-annual contract with the company BASF, Ludwigshafen, Germany. The achievements of this cooperation with BASF were patented in 43 countries around the world.

The partnership with Prof. Bartlett led to another very important research field: the preparation of thermodynamically unstable fluorides in high oxidation states. In 1989 the joint efforts of the research teams from Ljubljana and Berkeley resulted in a synthetic route for the preparation of high-oxidation-state binary fluorides. This approach uses a strong acceptor fluoride, such as AsF_5 , to extract the F from anionic relatives of the binary fluoride, which is dissolved in anhydrous hydrogen fluoride (aHF). It was admitted by the Nobel Prize chemist Prof. Roald Hoffmann, in a column for the magazine American Scientist

(Vol. 89, July-August 2001, p. 311), that Profs Boris Žemva and Neil Bartlett had a pioneering role in the synthesis and characterization of high-energy oxidants. It is at this point that we are able to highlight Prof. Žemva's scientific impact by referring to Prof. Bartlett's statement about his colleague's work (Journal of Fluorine Chemistry, 127, 2006): »I do not exaggerate when I record that he (B.Ž.) set the standards for high-quality experimental work in fluorine chemistry at Berkeley.«

Another important research field should be mentioned. In the past decade his research interests have been focused on the preparation of various coordination compounds with – for the majority of chemists – very unusual ligands, such as XeF₂, HF, and AsF₃. A great structural diversity is found with these types of compounds and the research activities in this field are still very active.

In 2006 he stepped down as head of the department. However, he remained actively involved in its research activities until his full retirement in 2012.

Prof. Žemva left a permanent mark on the field of education. Under his mentorship, six students graduated, six students finished their M.Sc. theses and eight young researchers finished their Ph.D. theses. Even now, after retirement, he is still helping two young researchers to prepare their Ph.D. theses. He is also very active in the International Postgraduate School »Jožef Stefan« as Vice-Dean, where he teaches the subject of Selected Topics in Inorganic Chemistry.

Prof. Žemva has published over 150 journal articles and had more than a hundred invited lectures around the world – in Europe, the United States, China and Japan. He has given lectures at universities, institutes and in industry (3M, St. Paul, USA; Asahi Glass, Yokohama, Japan; and BASF, Ludwigshafen, Germany), as well as at symposia and conferences. He was a guest editor of four special issues of scientific journals: European Journal of Solid State and Inorganic Chemistry, Journal of Fluorine Chemistry and a thematic issue of Solid State Sciences. He is member of the Editorial Boards of several journals: Journal of Fluorine Chemistry, Solid State Sciences and Acta Chimica Slovenica. His international reputation is also demonstrated by his activities in the international community of fluorine chemists. In 1995 he was Chairman of the 11th European Symposium on Fluorine Chemistry in Bled; then in 2010 he was Honorary Chairman of the 16th European Symposium on Fluorine Chemistry in Ljubljana, and in 2006 he was Chairman of the 5th International Symposium on Inorganic Materials in Ljubljana.

The results of Boris Žemva's research are an important contribution to our knowledge of chemistry and are often described and cited in textbooks of modern inorganic chemistry. Furthermore, he was the only Slovenian inorganic chemist invited to participate in writing for the encyclopaedia of inorganic chemistry (he wrote the chapter »Noble Gases: Inorganic Chemistry« in the Encyclopaedia of Inorganic Chemistry, editor King R. Bruce, John Wiley, 1994). At this point it is also important to mention the book »Advanced Inorganic Fluorides: Synthesis, Characterization and Application, editors: T. Nakajima, B. Žemva and A. Tressaud, Elsevier, 2000, which presented an authoritative overview of the state of the art in the field of inorganic fluorine chemistry.

The research achievements of Boris Žemva have been noticed and appropriately recognized by the Slovenian and worldwide scientific communities. In 1989 he received the Boris Kidrič

Award for exceptional achievements in the field of fluorine chemistry, in 1993 he was invited as a visiting research professor (Visiting Miller Professor) at the University of California, Berkeley, USA, and in 1997 he was invited as a visiting professor at the Institut de Chimie de la matière Condensée de Bordeaux, Pessac, France. We should also point out the prestigious German Alexander von Humboldt Research Award, which he received it in 1999. The Humboldt Research Award is granted in recognition of a researcher's entire achievements to academics whose fundamental discoveries, new theories, or insights have had a significant impact on their own discipline and who are expected to continue producing cutting-edge achievements in the future. To date he is the only Slovenian scientist to have received this award. In 2001 he was elected Ambassador of Science of the Republic of Slovenia in recognition of his collaboration with research groups around the world and his promotion of Slovenia. In 2006 he was presented with – as the only Slovenian and just the fourth European scientist – the Award of the American Chemical Society (ACS) for creative work in the field of fluorine chemistry. On this occasion, the ACS held a special symposium that focused on the winner of the award in Atlanta, USA. A special issue of the Journal of Fluorine Chemistry (J. Fluorine Chem. 127, 2006) was devoted entirely to him. Most of the papers included in the special issue were from invited lecturers who participated at the symposium, although many of the papers were submitted by other friends and colleagues. In 2010 he was elected to the European Academy of Sciences based in Liege, Belgium.

At this point we should again mention the Zois Award he received in 2011. We believe that this recognition by the Slovenian scientific community is one of his favourite awards. And then, to his pleasant surprise, he received the award for Mentor of the Year 2012, which was given to him by the society of Young Researchers of Slovenia. The award emphasised not only his scientific input but also his personal characteristics.

A description of Prof. Žemva's career and achievements would not be complete without mentioning his international collaborations over the years. He had, and still has, very close collaborations with several scientists and groups from all over the world, from Japan, Germany, France, Poland, the United States and Canada. He has said many times that close collaborations with people all around the world are priceless and need to be cultivated. He has always enjoyed the company of his international friends and colleagues, and we are glad that many of these friends and colleagues accepted our invitation to submit a paper for this special issue. They come from all over the world: from the east (Japan), through Europe (Poland, Ukraine, Germany, Slovenia and France), to the west (USA). We are also very glad that Slovenian fluorine chemists, not only from his research group but also from other related groups, devoted several papers to him on this happy occasion. We would really like to thank all of these authors for their contributions.

Dear Boris, on behalf of all your co-workers, colleagues, and friends, we want to sincerely congratulate you on the occasion of receiving the prestigious Zois Award. And as we know that there are still many challenges waiting for you, we are confident that you will be making many more contributions to the field in the future.

Melita Tramšek, Barbara Malič
Guest Editors