

## In memoriam of Rudolf E. Kaiser (1930–2021): Founder of Chromatographia

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Rudolf E. Kaiser passed away on August 6, 2021, after a short illness. The latest 25th International Symposium on High-Performance Thin-Layer Chromatography (HPTLC), jointly organized with the 26th International Symposium on Separation Sciences in Ljubljana, Slovenia from 28 June to 1 July, 2022, was dedicated to his memory and the book of abstracts started with a memorial statement highlighting his impact and importance for TLC and HPTLC. Indeed, Rudolf started his scientific career in 1953 by using TLC for his doctoral study work on the catalytic oxidation products of hydrocarbons. In 1954, he completed his Ph.D. at the University of Leipzig with a study on circular reversed-phase planar chromatography of synthetic fatty acid mixtures. His interest in this simple but powerful technique continued throughout his career. In his Institute for Chromatography in Bad Dürkheim, he introduced the HPTLC technique in close cooperation with some colleagues in 1976. In 1977, Rudolf and Al Zlatkis published

the book *HPTLC, High Performance Thin-Layer Chromatography* as volume 9 of the Journal of Chromatography Library [4]. Convinced by the unique advantages of HPTLC, he wrote in the preface “Most of the short-comings of HPLC can be avoided using TLC methods. This book is not meant to discredit HPLC. Indeed, it is meant for those who use HPLC.” In 1980, he organized the first International Symposium on *High-Performance Thin-Layer Chromatography* at his Institute for Chromatography in Bad Dürkheim. This was the start of the International HPTLC symposium series. After founding *Chromatographia* as his first journal in 1968, he founded the *Journal of Planar Chromatography* in 1988 (see memorial statement of the present Editor-in-Chief, <https://doi.org/10.1007/s00764-021-00126-4>).

In the interest and for the benefit of neophytes in the field, some further information is given on the tremendous impact that his curriculum has had on other chromatographic techniques and in particular on (capillary) gas chromatography (GC), in which he was a pioneer and became an icon. Soon after his doctorate he became the youngest director of the Separation Science Division at the German Academy of Sciences (Berlin and Leipzig) and started designing capillary GC instrumentation including metal capillaries and detectors. In 1959, he published the book *Gas Chromatography*, eagerly received by the chromatographic community. In the same year, he coined the phrase “*Chromatography separates substances but unites people*” at the first Chromatography Conference in Moscow. He invited the Russian Scientist Shuchovitsky to translate this sentence into Russian. The Russian version as witness to Rudolf’s historical phrase is:

„Хроматография разделяет вещества,  
но соединяет людей“  
(Жуковички, Каузер)  
15 X 59, ШШ

Note that his saying became famous, and in 1992, the new tombstone of the founder of chromatography Michael Tswett in Voronezh cited this saying in Russian: *He could discover chromatography, which separates molecules but unites people.*

In 1960, Rudolf left East Germany with his family and joined BASF in West Germany. He introduced capillary GC at BASF both for research and quality control and developed a unique dedicated capillary GC instrument, soon known as the so-called „Kaiser pod“. This prototype went into production at BASF and was used as a reliable in-house GC, since commercial instruments were not available yet. During this period, he also introduced the concept of environmental analysis at BASF. This marks the first time in the world that such an analysis was carried out.



In the early sixties, Rudolf published four comprehensive text books entitled „Chromatographie in der Gasphase“. One was the first book worldwide on capillary GC, which described state-of-the-art capillary GC including detailed procedures for column preparation and standard GC hardware modifications. Another book was dedicated to quantitative analysis, which illustrates that he was very advanced in his estimates of the possibilities of chromatography in general. In Germany, his books were named GC Bible. The English editions became soon standard reference books in many laboratories.

Fulfilling his dreams of scientific freedom and international collaboration and cooperation, he founded the Institute for Chromatography in Bad Dürkheim in 1972. It became the first foremost international private research and teaching institution where close to 10,000 chromatographic practitioners from over 50 countries were inspired through scientific collaborations, courses and seminars organized in-house or out-house at different universities and industrial laboratories. He aspired to establish science and collaboration without any borders. Based on his international contacts and together with requests of course participants, he came to the conclusion that there was an urgent need to organize

meetings in specific domains of chromatography in order to share and disseminate the knowledge and know-how internationally. His drive was so strong that he started as private person world-famous symposia and international journals.

In 1975, he started the series of *International Symposium on Capillary Chromatography* in Hindelang, Germany that was later mainly organized in Riva del Garda, Italy but also in different cities in the States, in Japan and in Dalian, China. This series was extremely successful with up to 1000 participants in the nineties. One of the highlights of this symposium series was the introduction of fused silica capillaries by Ray Dandenau and Ernie Zerenner. This invention had and still has a great impact on all forms of chromatography and electrophoresis. Together with Rudolf, they received the famous Golay (inventor of capillary GC) Award in 1989. Soon after the fall of the Iron Curtain, he started the *International Symposium on Chromatography and Spectroscopy in Environmental Analysis*. The first meeting took place in St. Petersburg, Russia. His drive indeed was endless. In addition to the aforementioned journals *Chromatographia* and *Journal of Planar Chromatography*, he founded the *Journal of High-Resolution Chromatography* and *Chromatography Communications* in 1978 that merged later with *Journal of Microcolumn Separations* and is now the *Journal of Separation Science*. Rudolf was also a propagonist of introduction of computers in the laboratory and although he was familiar with an IBM with fantastic computing power during his stay in BASF, he became an Apple fan! Already in 1983, he founded the journal *Computer Applications in the Laboratory*. The idea was far too advanced in the time and the lifespan of the magazine was therefore only two years. Besides starting journals, he also published more than 200 publications in international journals with peer review and wrote more than 20 books, some with challenging titles, such as *Computer Chromatography* in 1983!

Rudolf's achievements have been recognized by a number of important awards: the Tswett Medal of the Russian Academy of Sciences (Moscow, Soviet Union, 1978; as the first foreign recipient); Gold Medal of the Chinese Academy of Sciences and Chinese Chemical Society (Beijing, People's Republic of China, 1988); A.J.P. Martin Award (Brighton, United Kingdom, 1989); Marcel Golay Award (Riva del Garda, Italy, 1989); Tswett Medal of the Chromatographic Society of Russia (Düsseldorf, 1995), Federal Cross of Merit 1st Class (Berlin, 1996; awarded by the President of the Federal Republic of Germany Roman Herzog for his contribution to environmental analysis and his international activities) and Clemens Winkler Medal of the Gesellschaft Deutscher Chemiker (Munich, 2010).

Rudolf was one of the most creative and audacious analytical chemists of our time. His greatest strength were quick grasp of the essentials, brilliant thinking and perseverance to devise unconventional solutions to problems.

He was an inspiring researcher and mastermind. Highly dedicated and passionate, he was always a great friend and supporter of chromatography in general but especially of capillary GC and HPTLC. His words carried great weight, even if quite a few of his companions did not understand his progressive thinking. His wit and irony in conversations and at the same time his twinkling eyes will remain forever. He was always quick and forward thinking, a consequence of his tough life challenges, which he mastered excellently throughout his exemplary life. He was a good friend and constant inspiration to us personally and professionally, as well as to so many others in our profession. He will remain one of our favorite examples of scientists and will be in our hearts and memories forever. Moreover, Rudolf is internationally recognized as a chromatographic icon and icons do not die, they only slide to the other side from where he will

further inspire the current and future chromatographers with twinkling eyes.

Gertrud Morlock, Bernd Spangenberg, Irena Vovk, and Pat Sandra.

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