

Obituary

In memory of Hartmut Krienke



This brief essay is commemorated to Prof. Dr. Hartmut Krienke, well known scientist in the theory of electrolyte solutions. Prof. Dr. Hartmut Krienke passed away in Rostock at the age of 80 on October 28, 2023, surrounded by his family after a long illness. We express our deepest condolences to his family, colleagues and friends.

Hartmut Krienke was born on July, 28, 1943 at Heilsberg in Ostpreussen. After the World War Two he lived in Rostock till 1992. He finished Secondary school “Abitur” and Rostock University. Having graduated from the Physics Department of the Rostock University in 1966 he began his scientific work in the statistical mechanical theory of ionic fluids with the applications to the electrolyte solutions. The results of his studies were summarized in his successfully defended doctoral thesis in Theoretical Physics in Rostock University in 1972 under the guidance of Prof. Dr. Günter Kelbg. He continued his scientific work at the Physics Department of Rostock University in the field of statistical mechanical theory of liquids and solutions combining his scientific work with teaching for students of physics, mathematics and other disciplines. The results of the scientific research of H. Krienke were summarized in his second doctoral thesis with habilitation in Theoretical Physics in Rostock University in 1987.

The first research paper of Krienke was published in 1966 [1] together with G. Kelbg and W. Ebeling. It was devoted to the development of statistical thermodynamics of strong electrolyte solutions. In the next papers the Debye-Huckel theory was generalized for the description of concentrated electrolyte solutions [2]. It was also very important in this period of Hartmut’s activity concerning the description of transport processes in electrolyte solutions. The modern level of this theory was developed by the Rostock group of Falkenhagen, Ebeling, Kremp, Krienke and coworkers that introduced the concept of the direct correlation force and developed the non-equilibrium integral equation approach [3]. During this time there was also proposed an iterative method of solving the Ornstein-Zernike integral equation for pair distribution functions in the theory of equilibrium properties of fluids which gave a simple way of constructing optimized cluster expansions for the description of thermodynamical and structural properties of fluids [4].

From 1976 till 1990 H. Krienke was member and Scientific Secretary of the “Council for Research on Liquids” of the German Democratic Republic (GDR). This Council organized four international meetings. A great many scientists from the world, in particular from East Europe and former Soviet

Union, had nice reminiscences from these meetings which were every time very successful thanks to the organizational activities and kindness of Hartmut.

However, the possibilities for scientific and pedagogical carrier for H. Krienke in GDR were limited. He could not accept the ideas of the regime in GDR. New possibilities appeared after unification of Germany. In 1990–1991 he was invited by Prof. Dr. J. Barthel as guest professor to the Institute for Physical and Theoretical Chemistry at the Regensburg University. In 1991–1992 he works in the Ministry of Culture and Science of the Mecklenburg-Vorpommern state. In 1992–2008 he works as University Professor for Physical Chemistry at the University of Regensburg at the Faculty of Natural Sciences. At the same time, he was the leader of a Workgroup “Theory of Liquids and Solutions” at the Institute for Physical and Theoretical Chemistry of the University of Regensburg.

At this period he investigated structural, thermodynamic and transport properties of polar liquids and ionic solutions starting from realistic models. In such models the anisotropic geometry of molecules and ions (sizes, bond-lengths and bond-angles) was taken into account, as well as the distribution of multipole moments or partial charges and polarizability of the molecules. He considers different solvents such as acetonitrile, acetone, dioxane, chloroform, tetrahydrofuran, methylene chloride, formamide, dimethylformamide, N-methylformamide, methanol, water and mixture of these solvents [6, 10–12]. His activities were also connected with the development of algorithms for the solution of the molecular Ornstein-Zernike integral equations and computer simulation methods for the investigation of such systems [5]. He also uses different techniques for the treatment of solvation and association in electrolyte solutions. Together with Ukrainian colleagues Hartmut developed an associative mean spherical approach for the treatment of ionic associations in electrolyte solutions and application of this theory for the description and interpretation of thermodynamic properties of non-aqueous electrolyte solutions [7–9]. It should be mentioned that he worked in close contact with experimentalists from Regensburg University.

After retirement Hartmut continued to work together with colleagues from Regensburg University and Rostock University as Emeritus Professor. He came back to the problems of the influence of molecular structure on the conductivity [13]. Together with Prof. Dr. Ebeling, H. Krienke worked a lot on the theory of individual ionic activity coefficients of electrolyte solutions with multiply charged ions and application of this theory to the modelling of the Baltic sea water [14, 15]. His last paper [15] was published in the second issue of the journal “Condensed Matter Physics” this year.

Together with J. Barthel and W. Kunz, Prof. Dr. H. Krienke is coauthor of an excellent book [16] which presents an encyclopaedic view on the modern state of the art of electrolyte solutions with successful combination of experimental and theoretical materials. H. Krienke was a supervisor of nine successful dissertations. H. Krienke was member of the editorial board of the journal “Condensed Matter Physics” and “Journal of Molecular Liquids”. In 2002 he was awarded the order of “Verdienstkreuz am Bande des Verdienstordens der Bundesrepublik Deutschland”.

H. Krienke granted significant attention to the Ukrainian-German scientific collaboration. The permanent and fruitful collaboration of H. Krienke with Ukrainian scientists was going on since 1966 till nowadays. After H. Krienke had graduated from Rostock University in 1966–1967 he stayed at the faculty of Physics of the Ivan Franko University in Lviv for additional studies with Prof. Dr. I. R. Yukhnovskii as supervisor. The collaboration between the group of Hartmut Krienke and the group in Lviv was continuing in different forms up to the last year of his life.

Hartmut Krienke was a very intelligent and sympathetic personality. He loved literature, arts and music. He was also a family man, committed to his wife, daughters and grandchildren. Everybody who contacted him had nice reminiscences of these pleasant meetings.

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List of main publications of Professor Dr. Hartmut Krienke

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