Preface to the Gerhard M. Schneider Festschrift

It is a special pleasure for me to introduce this Festschrift of the *Journal of Chemical and Engineering Data* to honor Professor Emeritus Dr. h.c. Gerhard M. Schneider formerly of the Ruhr University of Bochum, Germany, on the occasion of his 77th birthday. The Festschrift contains 38 manuscripts, a proof of his continuing influence.

Gerhard Schneider is a pioneer of high-pressure fluid thermodynamics. Those who study the phase diagrams of mixtures under pressure, especially their systematic classification, are bound to find and appreciate his work. However, he did not confine his interests to phase diagrams of mixtures. He also investigated the effects of pressure in many, widely varying applications. Indeed, he regarded pressure as a control variable equal with temperature.

Schneider was born on May 7, 1932, in Neufechingen, near Saarbrücken, the capital of the Saar region of Germany. His childhood was influenced by World War II, and in 1951, he studied chemistry at the University of Saarbrücken that was operated under French administration.

In 1957 he obtained a chemistry diploma from the University of Göttingen and in 1959 a doctorate under the supervision of Professor Wilhelm Jost. Schneider then went to the University of Karlsruhe to work under Professor Ernst Ulrich Franck where he obtained his habilitation in 1965. In 1969 Schneider was appointed Chair of physical chemistry at the Ruhr University of Bochum where he remained until his retirement in 1997.

In this role, Schneider initially worked on nonelectrolyte mixtures and demonstrated experimentally the classification of phase diagrams proposed by Scott and van Konynenburg. During his tenure at Bochum he developed a range of experimental methods, many of which are in common use today, and some have been developed commercially. These methods included the following: (1) supercritical fluid chromatography (SFC); (2) Taylor dispersion experiments to determine diffusion coefficients of solutes for SFC; (3) high-pressure differential thermal analysis for liquid crystals; (4) high-pressure differential scanning calorimetry; (5) polarization microscopy of liquid crystals in a diamond anvil; (6) NIR and UV spectroscopy of compressed fluid mixtures utilizing fiber optics; (7) temperature jump and pressure jump experiments to determine the kinetics of chemical reactions and phase separations; and (8) both synthetic and

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analytic techniques for the determination of phase equilibria in fluid mixtures. To do this work Schneider developed pressure vessels with optical windows and sliding seals that operated at pressures on the order of 100 MPa. Indeed, it was a joke in the laboratory to refer to pressures below the 10 MPa threshold as a "bad vacuum".

With temperature and pressure, one has two parameters that can be used to control solubilities, and Gerhard Schneider frequently proposed the use of supercritical fluids as tunable solvents for many industrial applications, especially when nontoxic solvents were required.

Recent years have shown an increasing number of such applications, from decaffeination of coffee beans to the extraction or purification of vegetable oil or biogenic dyes. Gerhard Schneider conducted pioneering work on the dyeing of textiles using supercritical techniques. In addition, he was always much interested in international cooperation. His Institute frequently hosted scientists from all over the world, and he himself served the scientific community for many years by his IUPAC activities: He was a member, then chairman, of the IUPAC Commission on Thermodynamics and later President of the Physical Chemistry Division of IUPAC (1989−1991).

In recognition of his scientific achievements, the German Bunsen Society for Physical Chemistry awarded him the Nernst Prize in 1969. He was its Wilhelm Jost lecturer in 1994/95 and was the Rossini Lecturer at the International Conference on Chemical Thermodynamics in Como, Italy, in 1990. In 2003 he was awarded a *Dr. honoris causa* by the Odessa State Academy of Refrigeration.

Perhaps more important than these honors is the fact that his laboratory was a pleasant and inspiring place to be. Schneider believed in the creativity of his students and gave them time and freedom to both solve their problems and develop their skills. In this he was very successful because between 1956 and 2006 he published more than 300 articles and supervised 78 doctoral theses with all but one experimental in content: this demonstrates his impressive productivity and ability to attract gifted students.

I am personally indebted to Gerhard Schneider for introducing me to mixture thermodynamics (which made a lasting impression on me), for giving me the freedom to pursue theoretical research projects for my doctoral thesis, and for initializing my academic career by letting me work as an assistant and then as a lecturer at his Institute.

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