

New commendable books in the fields of thermodynamics and thermal analysis by Springer-Verlag (Berlin/Heidelberg)

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Numerous reviews on customarily inventive books dealing with the science of thermal processes known as the field of thermodynamics and its derived domain of thermal analysis have been published. Looking at such a long series of books from early stages, one may become surprised to see some novel approach differing from the already known familiarity of books such as P. G. Tait “Sketch of Thermodynamics” (1877) and “Heat” (1984); Č. Strouhal “Thermics” (1908); M. Haas “Thermodynamika” (1927); P. W. Bridgeman “Nature of Thermodynamics” (1941); W. Świątosławski “Microcalorimetry” (1946); I. Prigogine, R. Defay “Chemical Thermodynamics” (1954); E. A. Guggenheim “Thermodynamics” (1959); H. B. Callen “Thermodynamics: an introduction to thermostatics” (1960); K. Denbigh “Principles of Chemical Equilibrium” (1961); L. A. Berg “Introduction to thermal analysis” (1961); P.D. Garn “Thermoanalytical methods of investigation” (1962) or D. S. L. Cardwell “From Watt to Clausius: the rise of thermodynamics” (1971) up to the recent books by, e.g., C. Truesdell, S. Bharatha “Concepts and Logic of Classical Thermodynamics as a Theory of Heat Engines” (1988); D. Jou, J. Casas-Vazques and G. Lebon “Extended Irreversible Thermodynamics” (1993); R. F. Speyer “Thermal analysis of materials” (1994); F. Paulik “Special trends in thermal analysis” (1995); F. Maršík, I. Dvořák “Biothermodynamics” (1998); T. Hatakeyama “Handbook on thermal analysis” (1999); S. A. Kauffman

“Investigations” (2000); M. E. Brown “Introduction to thermal analysis” (2001); J. B. Ott, J. Boerio-Goates “Chemical thermodynamics: principles and application” (2000); P. Richet “Physical basis of thermodynamics” (2001); B. C. Eu “Generalized Thermodynamics: toward thermodynamics of irreversible processes” (2002); P. J. Haines “Principles of thermal analysis and calorimetry” (2002); J. Šesták “Heat, thermal analysis and society” (2004) and “Science of heat and thermophysical studies: a generalized approach to thermal analysis” (2005); G. M. Anderson “Thermodynamics of natural systems” (2005); C. J. T Lewis “Heat and thermodynamics: a historical perspective” (2007); Y. Demirel “Nonequilibrium thermodynamics: transport and rate processes in physical, chemical and biological systems” (2007); K. Wilmanski “Continuum thermodynamics” (2008); L. Leuzzi, T. M. Nieuwenhuizen “Thermodynamics of the glassy state” (2008); R. Balmer “Modern engineering thermodynamics” (2010); T. Engel, P. Reid “Thermodynamics, statistical thermodynamics & kinetics” (2010); or J. Gemmer, M. Michel, G. Mahler “Quantum thermodynamics: emergence of thermodynamic behavior within composite quantum systems” (2010).

However, the four below indicated books, showing the forward-looking publication trends of the publishing house Springer, surely make an exemption as all of them are really praiseworthy of reading despite the possible reader’s wholesale knowledge. These are written by two outstanding scientists both originating from Germany providing a systematic introduction into the fundamental ideas of thermodynamics at a somewhat critical and advanced level, and they exhibit many applications of the theory in the areas of physics, chemistry, physical chemistry, materials science, biology, engineering, and in yet unusually exploited corners.

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Ingo the Müller (1937–) has been active in the field of thermodynamics and continuum mechanics for many years. Everyone in this area knows his Entropy Principle, the field of Extended Thermodynamics, and his work on shape memory alloys or thermodynamics and evolutionary genetics just to name his most prominent contributions. He is currently a professor of Thermodynamics at the Technical University Berlin, serves as the president of the International Society for the Interaction of Mechanics and Mathematics (ISIMM), holds an honorary doctorate from the Technical University Darmstadt, and has published more than 200 scientific articles including several books. The two most important mentioned below reveal a full-length book on both the history and fundamentals of thermodynamic which have never been published before.

A History of Thermodynamics the doctrine of energy and entropy

(330 pages) ISBN 978-3-540-46226-2, Springer 2007.

Contents: Temperature. Energy. Entropy. Entropy as $S=k \ln W$. Chemical potentials. Third law of thermodynamics. Radiation thermodynamics. Thermodynamics of irreversible processes. Fluctuations. Relativistic thermodynamics. Metabolism.

Fundamentals of Thermodynamics and Applications with historic annotations and many citations from Avogadro to Zermelo

(404 pages) ISBN: 978-3-540-74645-4, Springer 2009.

Contents: Prologue on ideal gases and incompressible fluids. Objectives of thermodynamics and its equations of balance. Constitutive equations. Reversible processes and cycles “ $p \, dV$ thermodynamics” for the calculation of thermodynamic engines. Entropy. Entropy as $S=k \ln W$. Steam engines and refrigerators. Heat Transfer. Mixtures, solutions, and alloys. Chemically reacting mixtures. Moist air. Selected problems in thermodynamics. Thermodynamics of irreversible processes.

Bernhard Wunderlich (1931–), US innovative educator, distinguished academic and pioneer of thermal analysis and thermodynamics of polymers, was born in Germany and has specialized in the research of the solid, liquid, and particularly in-between states of various macromolecules (plastics). He retired in 1988 after a 25 year period of teaching and research as Professor of Polymer Science at Rensselaer Polytechnic Institute in Troy, NY. He followed this with a second career as professor and internationally renowned, distinguished scientist at the University of Tennessee and Oak Ridge National displaying by now over 600 publications including several books. The last two books implicate a special attention showing a multifaceted but complete approach to statics and dynamics of macromolecular changes and to his life carrier attaining such a wide ranging knowledge.

Thermal analysis of polymeric materials

(894 pages) ISBN 3-540-23629-5, Springer 2005.

Contents: Atoms, Small and Large Molecule. Basics of Thermal Analysis. Dynamics of Chemical and Phase Changes. Thermal Analysis Tools. Structure and Properties of Materials. Single Component Materials. Multiple Component Materials.

A Science Career against All Odds a life of survival, study, teaching and travel in the twentieth century, (550 pages) ISBN 978-3-642-11195-2, Springer 2010.

Contents: Early childhood 1931–39. Years of war 1939–45. Final years in Brandenburg 1955–49. Humboldt University 1949–53. Goethe University 1953–54. Study in the US, 1954–58. Cornell University 1958–63. Rensselaer Polytechnic Institute 1963–88. University of Tennessee and Oak Ridge 1988–01. Epilogue.

The author wishes that the new buyers have the same good satisfaction as he had when reading the books.