Book Review

Science of Heat and Thermophysical Studies
A Generalized Approach to Thermal Analysis
by Jaroslav Šesták
Hardbound, ISBN: 0-444-51954-8, 486 pages,
publication date: Elsevier, Amsterdam 2005, price 175 Euro

Jaroslav Šesták has been a leading figure of thermal analysis for decades. He was a founding member of *Thermochimica Acta* and he is a member of editorial board of *Journal of Thermal Analysis and Calorimetry*. He is author/coauthor of nearly 300 papers that have received approximately 2500 citations. He was presented by several scientific awards, including an ICTAC award in 1992. His present book summarizes his extensive, comprehensive knowledge on the science of heat and the book is dedicated to the 40th anniversary of ICTAC. The term 'thermophysical studies' in the title is used in a generalized sense, as the chapters of the book reveals:

1. Some Philosophical Aspects of Scientific Research.
2. Miscellaneous Features of Thermal Science.
3. Fire as a Philosophical and Alchemical Archetype.
4. Concept of Heat in the Renaissance and New Age.
5. Understanding Heat, Temperature and Gradients.
6. Heat, Entropy and Information.
7. Thermodynamics and Thermostatics.
8. Thermodynamics, Econophysics, Ecosystems and Societal Behavior.
9. Thermal Physics of Processes Dynamics.
10. Modeling Reaction Mechanism: The use of Euclidian and Fractal Geometry.
11. Non-Isothermal Kinetics by Thermal Analysis.
12. Thermometry and Calorimetry.
13. Thermophysical Examinations and Temperature Control.
14. Afterward (including a brief history of ICTA creation)
15. Literature: 700 citations
16. Appendix: short characteristics of some selected individualities of the general history and recent thermal analysis as related to the book contents.

There is a particularly careful exploration of the philosophical and historical background of the treated subjects. The science history involves early Greek philosophical views, medieval alchemy, Renaissance upgrading as well as the recent and modern scientific achievements of the 18–20th Centuries. The author has also included views on the present and future aspects of the subject (caloric as entropy, information and organization, non-stationary heat diffusion, quantum diffusion and self-organization, thermal radiation and the modern concept of vacuum, etc.). However, in the present short book review there is no space to list all the subjects included in the book, accordingly I try to illustrate the broad spectrum of the work by two examples. The first chapter includes, among others, a few pages on the author's view on scientific publications in a world where approximately one million publications appear in each year in roughly ten million pages. The second chapter includes, among others, a brief review on the energy resources and their durability, sustainable protection of our environment, the greenhouse effect caused by the CO_2 emission, and the corresponding options of mankind.

1388–6150/$20.00

Akadémiai Kiadó, Budapest, Hungary
Springer, Dordrecht, The Netherlands

The modern theory of the heat science is outlined using a pertinent level of mathematical apparatus of so called 'near-equilibrium' thermodynamics (heating rate and the effect of temperature changes, non-equilibrium phenomena paying attention to nucleation and related kinetic and T-T-T phase diagrams, equilibrium background and the kinetic degree of transformation, variant and invariant processes, thermodynamics of glass transition). An unique separate chapter deals with the applicability of the thermodynamic theory for the description of social and economic phenomena (thermodynamic laws and human feelings, strategy of survivals). Two chapters treat in details the kinetics and mechanism of the thermal reactions (suitability of various models) and a relatively brief chapter of 35 pages reviews thermometry (mainly theory and practice of DSC and DTA) and calorimetry. Keeping in mind the broad subject area of the book, one cannot expect truly comprehensive reviews in a single volume of around 500 pages. The author, however, has obviously employed a thoughtful weighing and selection of the information available and provided a generalized outlook useful to the readers and their better orientation in modern sciences.

In my opinion, the primary beneficiaries of this book will be the lecturers of universities and colleges. They will find here a deep wealth of information helping to establish the proper background for their subject areas and to transform the usually dry topics of thermal science into exciting lectures. The book can also be recommended for all scientists who are interested in the deeper background of thermal analysis, calorimetry and thermodynamics, including history, philosophic aspects, modern non-equilibrium views and an outlook to the related other topics (characterization of curves, controversial character of bulk and spot measurements, oscillation modes, generality of power laws and logarithmic responses, geometrical self-similarity and fractal dimension, use of logistic functions, progressive concepts of electromagnetic zero-point radiation and quantum thermal physics).

Gábor Várhegyi
Institute of Materials and Environmental Chemistry,
Chemical Research Center, Hungarian Academy of Sciences
E-mail: varhegyi@chemres.hu

DOI: 10.1007/s10973-006-3044-4