

This issue of JMM is dedicated to Prof. Ing. Jaroslav Šesták, DrSc.
at the occasion of his 70th birthday



Prof. Jaroslav Šesták, MEng., PhD., DSc.

Jaroslav was born in the village ‘Držkov’ (North Bohemian Mountains) where he still possesses a small farm. He obtained a degree MEng in silicate chemistry (1962) and PhD in solid state physics (1968, both in Prague) latter degree was approved while he spend a year at the University of Missouri at Rolla as an assistant professor in ceramics (UMR 1970). He got married when working in Sweden (1969, Studsvik Nuclear Research Center) with a MEng graduate from Prague (Věra) who joined and then supported Jaroslav when he was staying at USA where she received her second degree in ceramics (M.S., UMR 1970). Since that Jaroslav and Věra have two children, daughter Elizabeth (Bětká, *1977) and boy Paul (*1980) who graduated in economics (B.S. 2007). He lives at the address: V stráni 3, CZ-15000 Prague, Czech Republic; Email: sestak@fzu.cz,

www.fzu.cz/~sestak.

Jaroslav devoted his scientific proficiency in experimental and theoretical studies related to the field of material thermodynamics and after communistic persecution (when he was not permitted to teach) he was finally allowed to became a full professor in material sciences and engineering (1993) and was credited by the highest gradation of D.Sc. for his life achievements. He edited and authored 15 books and monographs, published almost 300 papers that have received almost 2500 citations. Among the most important books belong “Thermophysical properties of solids” (Elsevier, 1988); “Kinetic phase diagrams: nonequilibrium phase transitions” (Elsevier, 1991), “Special materials and their advanced technologies” (Academia, 1993), „Vitrification, transformation and crystallization of glasses“(Elsevier, 1996),

* Corresponding author: sestak@fzu.cz

“Heat, thermal analysis and society” (Nucleus, 2004), “Science of heat and thermophysical study” (Elsevier, 2005), “Thermal physics of crystalline and amorphous materials” (Pardubice 2007) and “Some thermodynamic, structural and behavioral aspects of glassy and amorphous materials (Pilsen 2008). Jaroslav was a co-founding member of ICTAC (1965), *Thermochemica Acta* (1970) and *Journal of Mining and Metallurgy* (1997) and is a member of the editorial board of *Journal Thermal Analysis* as well as he participates in other scientific and educational boards.

Jaroslav gave over 300 invited key lectures and was presented with various scientific awards such as NATAS (USA 1974), Kurnakov (USSR 1985), Bodenheimer (Israel 1987), ICTAC (England 1992), Hanus (Czech Chemical Society) and Heyrovsky (Czech Academy of Sciences) medals (Prague 1998 and 2000 respectively) and Greek diploma of Honour (2007). Recently he became the honorary member of the Czech Engineering Academy (2004). He has developed into renewed teacher and mentor who has tried to introduce many new methods of interdisciplinary learning (endeavoring to bridge sciences and humanities) being successful both at home (cofounder of Faculty of Humanities of the Charles University in Prague (2000) and Institute of Interdisciplinary Studies of the West Bohemian University in Pilsen (2001), teaching at the Czech regional technical universities of Pilsen, Liberec and Pardubice as well as at the New York University in Prague since its creation in 2000) and abroad (co-founding member of the Faculty of Energy Science of Kyoto University, Japan 1996, being its professor emeritus and lecturing there in 2004 again). He lectured at

a number of various universities in USA, Japan, Poland, Slovakia, Norway, Italy, Chile, Argentina, etc., and recently Taiwan (2005 and 2006). He also cooperated in PhD program at the University of Beograd, metallurgical faculty in Bor.

Beside his scientific career he was a league basketball player, mountaineer (Himalaya, Caucasus, Asian Pamir, South American Andes and the European Alps – earning needed funds as an occasional window-cleaner roping down tall buildings), ski instructor, politician (deputy and member of the Prague government 1994-1998, once a candidate for the seat in the Czech parliament) and enthusiastic globetrotter (notoriously carrying a sleeping sack in his backpack while participating at scientific conferences). Within this hobby he has also become a recognized photographer who held twenty one photo-exhibitions (such as Smíchov City Hall 1998, EcceTerra Gallery 2000, at the occasion of 10th anniversary of the Western Bohemian University, Pilsen 2001, Klamovka Gallery 2003, Franzensbad and Prague Academy of Sciences 2005, Trencin Castle 2007, Lucerna Pragua 2008, etc.) and as a renowned scientist, he was invited to make photo-exhibitions at a number of international conferences (e.g., Tokyo 1992, Cordoba 1995, Zakopane 1997, Balatonfured 1998, Copenhagen 2000 or Vancouver 2002). Jaroslav ventured a curiosity not yet common within scientific circles when he illustrated his recent book “Heat, thermal analysis and society” by 60 full-page artistic photos (available to get viewing on his websites: <www.fzu.cz/~sestak>).

Among other important publication during last ten years we can mention following:

- Ž. Živkovič and J. Šesták, Kinetics and mechanism of the oxidation of molybdenum sulphide, *J. Therm. Anal.* 53 (1998) 263-267.
- J. Šesták, V. Šestáková and B. Štěpánek Doping limits and growth thermodynamic of GaSb crystals *J Thermal Anal Calor* 56 (1999) 749-754.
- J. Šesták The history and future of thermal analysis; thermochemical and thermodynamic background *J Mining Metal* 35 (1999) 367-390.
- A. Varschavski and J. Šesták Applications of differential scanning calorimetry for the study of transformation processes in quenched alloys, pp. 85-111 in *Characterization techniques of Glasses and Ceramics*, ed. J. M. Rincon and M. Romero, Springer-Verlag, Berlin 1999
- D. Živkovič, Ž. Živkovič and J. Šesták Predicting of the thermodynamic properties for the ternary system Ga-Sb-Bi *Calphad* 23 (1999) 113-131.
- J. Czarnecki and J. Šesták Practical thermogravimetry *J Thermal Anal Calor* 60 (2000) 759
- J. Fiala and J. Šesták Databases in materials science: contemporary state and anticipated future *J Thermal Anal Calor* 60 (2000) 1101-1110.
- N. Koga and J. Šesták Crystal nucleation and growth kinetics in lithium diborate glass by thermal analysis *J. Am. Ceram. Soc.* 83 (2000) 1753-1760.
- B. Hlaváček, J. Šesták and J. J. Mareš Mutual interdependence of partitions functions in vicinity of T_g transition *J Thermal Anal Calor.* 67 (2002) 239-248.
- J. Stávek, M. Šípek and J. Šesták The application of the principle of least action to some self-organized chemical reactions *Thermochim. Acta* 388 (2002) 441-450.
- J. Šesták and Z. Chvoj Irreversible thermodynamics and true thermal state dynamics in view of generalised solid-state reaction kinetics *Thermochim. Acta* 388 (2003) 427-439.
- J. Šesták and P. Lipavský On the chronicle of high- T_c oxide superconductors: material science and theoretical basis *J Thermal Anal Calor* 74 (2003) 365-373.
- B. Štěpánek, J. Šesták, J. J. Mareš and V. Šestáková Thermal conditions of growth and the necking evolution of Si, GaSb and GaAs *J Thermal Anal Calor* 72 (2003) 165-172.
- Z. Kalva and J. Šesták Transdisciplinary aspects of diffusion and magnetocaloric effect *J Thermal Anal Calor* 76 (2004) 67-74.
- J. J. Mareš, J. Stávek and J. Šesták Quantum aspects of self-organized periodic chemical reaction *J Chemical Physics* 121 (2004) 1499-1503.
- J. J. Mareš, J. Šesták, J. Stávek, H. Ševčíková, J. Křištofik and P. Hubík Do periodic chemical reactions reveal Fürth's quantum diffusion limit? *Physica E* 29 (2005) 145-149.
- J. Šesták On the Availability, Exploitability and Sustainability of our Energy Resources in Chapter of book: „Promises of Science“ Knut E., Pliska V., Folkers G. (ed.), Collegium Helveticum, Zurich 2006, str. 69-74.
- J. Šesták and J. Zámečník Can clustering of liquid water and thermal analysis be of assistance for better understanding of biological germplasm exposed to ultra-low temperatures, *J. Thermal Anal. Calor.* 88 (2007) 411-416
- J. Strnad, Z. Strnad and J. Šesták, Physico-chemical properties and healing capacity of potentially bioactive titanium surface *J. Thermal Anal. Calor.* 8 (2007) 775-779
- J. Šesták and J.J. Mares From caloric to

statmograph and polarography J. Thermal Anal. Calor. 88 (2007) 763-768

J. Šesták, Some models classification of geometrical bodies and their development in historical applications chapter in book „Metaphores and models“ (Knut E., Pliska V., Folkers G., ed.), Collegium Helveticum, Zurich 2007, p. 87-90

J. Šesták How it is with the warming of our planet Earth and what is the role of green gases – reflection on the book by Vaclav Klaus “Blue not green planet” Energetika 58 (2008) 7-10,

J.J. Mareš, P. Hubík, J. Šesták, V. Špička, J. Křištofik, J. Stávek A Phenomenological Approach to the Caloric Theory of Heat: an alternative thermodynamics Thermochim. Acta 474 (2008) 1

J. Šesták, Z. Strnad, J. Strnad, M. Holeček and N. Koga Biomedical Thermodynamics and Implantology aspects of Biocompatible Glass-ceramics and otherwise modified inorganic materials and surfaces Advanced Materials Research 39/40 (2008) 329

J. Šesták, J.J. Mareš, P. Hubík and I. Proks Contribution by Lazare and Sadi Carnot to the Caloric Theory of Heat: its inspirational role in thermodynamics J Thermal Anal Calor. (2008).

His latest book:

SCIENCE OF HEAT AND THERMOPHYSICAL STUDIES

A Generalized Approach to
Thermal Analysis



Description

The book provides a non-traditional bridging of historical, philosophical, societal and scientific aspects of heat with a comprehensive approach to the field of generalized thermodynamics. It involves Greek philosophical views and their impact on the development of contemporary ideas. Covered topics include:

- the concept of heat (caloric, entropy), temperature, gradients and generalization of transfers (Fick, Fourier, Ohm, Schrödinger's laws)
- thermometry and calorimetry, methods classification, theory and practice of DTA and DSC
- from Greek philosophy, via alchemy to caloric theory, power laws, logarithm and modern thermal physics
- from classical thermodynamics (thermostatics) to non-equilibrium and

quantum thermodynamics

- equilibrium, kinetic, T-T-T and T-C phase diagrams

- chemical kinetics and non-isothermal studies

- development of ideas: from heat to entropy, order and information

- thermal science applied to economy (econophysics), ecosystems and societal applications

- mesoscopic scales (quantum diffusion, zero-point electromagnetic radiation in vacuum)

- importance of energy science and its influence to societal life, energy resources and sustainability, environmental queries (thermal analysis in atmosphere, green house effect)

Audience

This title is recommended to specialists in thermal science (thermodynamics, thermal analysis and thermo-physical measurements of materials) as well as to the general scientist and students. It can serve as a reference text for those interested in the many concepts behind thermal physics and thermal analysis and possible applications in other areas, providing the reader with a wide background and framework of thermal sciences at present and in past. It contains 712 references and over 500 brief characteristics of some important scholars.

Chapter contents

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 Thermostatistics.

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

App.: epigrammatic connotation of some significant scholars and scientists

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Prof. dr Petra Šulcová

Prof. dr Živan Živković