



## Preface

The Symposium on Thermodynamics of Nuclear Materials (STNM) is one of the oldest in the field of nuclear science and technology. The first symposium in this series was held in 1962 in Vienna under the auspices of the International Atomic Energy Agency (IAEA). The proceedings of this first meeting present a milestone in the field and include experimental and theoretical contributions of many distinguished scientists. Ten symposia have been organised up to now, the last one in Halifax (Canada) in 2000, until 1979 under auspices of the IAEA, afterwards as sub-symposium of general thermodynamics or materials science conferences.

This special issue of Journal of Nuclear Materials presents a selection of papers based on the presentations at the 11th Symposium on Thermodynamics of Nuclear Materials that was organised by the Institute for Transuranium Elements from 6 to 9 September 2004 in Karlsruhe. The symposium was attended by 120 persons and the programme consisted of 16 invited lectures, 42 regular contributions and 30 short communications, addressing the latest results and the current trends in the field of thermodynamics of nuclear materials. As has been tradition, there were many presentations on the thermodynamics of oxide fuel materials (two sessions) and actinide materials in general (1). They showed an increasing number of modelling studies, and decreasing number of experimental studies. The large number of contributions to the pyrochemistry and advanced fuel sessions reflected the current interest of especially young researchers in these fields. Evidently STNM offered a welcome forum for the scientists involved in pyrochemical reprocessing although electrochemistry is strictly not ‘thermodynamics’. The session on ‘Environment and Waste’ focused on long-term stability of spent fuel and waste forms, where thermodynamics as well as kinetics must be taken into account.

A new feature of the Symposium was an honorary lecture to acknowledge outstanding contributions to the field of Thermodynamics of Nuclear Materials and/or to the Symposium. This lecture was named the Kubaschewski Honorary Lecture after the late Professor Oswald Kubaschewski (1912–1991), one of the ‘grand men’ of the post-war period who was among the active participants to the early STNM meetings. His famous book ‘Metallurgical Thermochemistry’ [1], that has been published in several editions, has been a ‘Bible’ for many generations of scientists involved in applied thermodynamics. Not only his experimental work on alloys is well known but also his pioneering efforts in thermodynamic data evaluation have had a large impact especially in the nuclear field. It has led to the series of reviews in the Atomic Energy Review Special Issues of the IAEA for which he was editor, the computer data bank of Scientific Group Thermodata Europe (SGTE), which he helped establishing, and CALPHAD, with which he was strongly involved in the early years. Further details of his scientific life and achievements can be found in Editorial Introductions of special issues of *Thermochemica Acta* [2] and *Journal of Phase Equilibria* [3] dedicated to him.

The first Kubaschewski Lecture was presented by Dr Heiko Kleykamp. He was in the fortunate position to learn thermochemistry from Professor Kubaschewski at the National Physical Laboratory (NPL) in the UK in 1969. Back at the Kernforschungszentrum Karlsruhe (KfK) he contributed systematically to the understanding of nuclear fuel (oxide, carbides) using micro-probe analysis and thermochemistry, and, very important, combining the results of these two techniques. A lot of our knowledge of the oxide and metallic precipitates in nuclear oxide fuel has been generated in his laboratories. He has also been involved in the organisation of STNM-8 to STNM-10 and chaired the round-table discussion about the future of the field of thermodynamics of nuclear materials at STNM-10. Since his retirement in 2002, he is working free-lance at the Forschungszentrum Karlsruhe (FZK) taking care that the unique information from the nuclear fuel research at FZK will be secured for future generations. This special issue will open with a paper on his personal highlights of his career.

During STNM-11 the discussion on the future of this symposium continued. As was already noted during the round table discussion of STNM-10, the emphasis of the symposium should be on ‘nuclear’ and not strictly on ‘thermodynamics’.

The Scientific Advisory Committee of STNM-11 discussed this in detail and felt that it is important to emphasise this broader scope in the symposium name. It was also concluded that the large number of participants in Karlsruhe stimulated the decision to continue STNM as a stand-alone series. Thus the next Symposium on Thermodynamics and Thermophysics of Nuclear Materials (STNM-12) will be organised by the University of Vienna in 2008.

## References

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- [3] P. Spencer, J. Phase Equil. 14 (1993) 406.

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