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Preface

This special issue of the Journal of Nuclear Materials contains papers presented at the 10th Symposium on Thermodynamics of Nuclear Materials (STNM) within the 16th International Union of Pure and Applied Chemistry (IUPAC) Conference on Chemical Thermodynamics, August 6–11, 2000 in Halifax, Canada. The plenary lecture, given by M. Yamawaki, titled “Thermochemical Studies of Advanced Nuclear Fuels and Materials”, has been published separately with the award lectures and plenary lectures from the other symposia in the Journal of Pure and Applied Chemistry.

The STNM symposia series began in 1962 in Vienna under the auspices of the IAEA, and has been held periodically since then – lately every 4 years. Since 1984, the symposia have been held within the framework of the IUPAC conferences – except for the 1988 meeting in Chicago, when the IUPAC meeting was held in Czechoslovakia. The number of published papers in the Proceedings reached a high of 67 in 1974, dropping to 35 in 1988 and 1992. Extensive Japanese support lifted the number to 67 in Osaka in 1996, and 38 are being published here. There were, however, 65 oral presentations in Halifax, with very good support from the Japanese, especially the Japanese universities. There has been a gradual reduction in the number of published papers from the USA, Soviet Union/Russia and Europe (France, however, rejoined the symposia after a total absence from the previous three), while the numbers have increased over that time from Japan and India.

At STNM-10, the strict definition of thermodynamics was relaxed to allow oral presentations on thermophysical properties, the thermoelectric effect and kinetics, some of which are published in these Proceedings. An informal Round Table Discussion was held during the symposium to address the issues of where future work in thermodynamics is needed, decreasing numbers of participants, and how much to relax the focus on thermodynamics at future meetings. There was some agreement that *nuclear* is the key word and that strict emphasis on thermodynamics is too limiting. It was also thought that since representation from the nuclear-waste community was low, and since there exist sufficient symposia elsewhere on waste materials, future STNMs could de-emphasize this topic. These are on-going issues for the organizers of STNM-11 at the Transuranium Institute, Karlsruhe, Germany.

At the Round Table Discussion, H. Kleykamp provided an assessment of where future work in thermodynamics is required:

- ternary U–Pu–O system phase equilibria and temperature dependences,
- minor actinides (Np, Am, Cm) and their compounds (oxides, carbides and nitrides): phase equilibria of multi-component systems; thermal/thermodynamic data,
- Pb–Bi melt (ADS reactor): thermodynamic data, oxygen solubility,
- fusion-blanket materials:
 - phase equilibria of ceramic breeder materials (e.g., Li_4SiO_4 , Li_2ZrO_3 , Li_2TiO_3) at low oxygen potentials
 - thermodynamics of Be compounds
 - oxygen solubility and activity and other thermodynamic data on liquid breeder materials – especially liquid Pb–Li.

Further ideas can be found in M. Yamawaki’s excellent manuscript in the Journal of Pure and Applied Chemistry.

As guest editor for the Proceedings, I thank the members of the Advisory Committee, M. Adamson, H. Kleykamp, Hj. Matzke, Z. Moser and Y. Yamawaki, who offered me this opportunity, guided me through the process, and assisted generously with the refereeing and editing.

R.A. Verrall
Guest Editor