ELSEVIER

Thermochimica Acta 391 (2002) 5–6

thermochimica acta

www.elsevier.com/locate/tca

Curriculum vitae of Michael J. Richardson

S.M. Sarge*

Physikalisch-Technische Bundesanstalt, Bundesallee 100, 38116 Braunschweig, Germany

Michael Richardson was born near Hull in the north of England in 1934. He studied chemistry at the University of Manchester and graduated with first class honours in 1955. He obtained his Ph.D. degree with John Rowlinson, also at Manchester, in 1958 and this was followed by 2 years at the Mellon Institute, Pittsburgh, with Paul Flory—his introduction to the polymer science that would form a significant part of his future career. He returned to the UK in 1960 to the Cavendish Laboratory in Cambridge to work on the electron microscopy of polymers. Philip Bowden's Physics and Chemistry of Solids Group in the Cavendish was one of the earliest multidisciplinary laboratories (long before the idea was fashionable) and working with a diverse range of physicists and engineers was a mind-broadening and valuable experience.

A move to the National Physical Laboratory (NPL; the UK standards laboratory), on the outskirts of London, followed in 1963 and this was "home" for the next 30 years. At this time there were active calorimetric groups at both the NPL and the National Chemical Laboratory (NCL) which were on adjoining sites. Michael's intention was to use adiabatic calorimetry to determine the surface energies of the recently discovered polyethylene single crystals. Everything was on what was, to the DSC generation, a massive scale: samples weighed tens of grams (grown from 0.1% solutions, etc.) and a full set of measurements took several weeks. "Single crystals" turned out to have very complex morphologies and reference data were needed for ideal *n*-alkane structures. The required homologues were either not available or were very impure so that extensive synthetic chemistry was an essential preliminary to his work.

Results were nearly ready for publication when claims being made for the new technique of DSC

---

*Tel.: +49-53159223140; fax: +49-5315923205.
E-mail address: stefan.sarge@ptb.de (S.M. Sarge).

0040-6031/02/$ – see front matter
PII: S0040-6031(02)00357-X

had to be seriously considered. Clearly the need for milligram quantities and a time scale of minutes rather than weeks was very attractive, especially when the data treatment (planimetry, cutting/weighing of areas) seemed to imply that heats of fusion, for example, were available with very little effort. Adiabatic calorimetry showed that some supplementary data treatment is needed and potential problems were confirmed when initial results with the first DSC at NPL would not reproduce the results of adiabatic calorimetry. The instrument clearly had potential and its arrival fortunately coincided with a policy change for materials work at the NPL—emphasis was placed more on standardisation and precision of measurements (in line with the bulk of the laboratory's work) rather than on the materials themselves. This was the basis of what was to become Michael's main work, the development of procedures for quantitative DSC, but the adiabatic calorimetry was an essential preliminary: without the well-characterised *n*-alkanes as reference materials progress towards quantitative DSC would have been severely hampered. It soon became clear that several "corrections" were needed before DSC results agreed with those from adiabatic calorimetry. Although simple, these corrections could only be made by using the data treatment facilities that were features of the (then) new microcomputers. Over the years various programs have been developed to give a range of thermodynamic quantities. These range from specific heat capacities (all DSC measurements at the NPL were routinely made in the specific heat mode to allow direct comparison of data on related materials, often at widely separated times) to free energy differences between a solid and (supercooled) liquid phase—the latter are of great use, for example, in defining the structural stability of drugs. DSC has long been used to determine the glass transition temperatures of polymers but results appear to depend on experimental conditions and change with these in an irrational way. Michael showed that an enthalpic definition of T_g removes all ambiguities and clarifies how T_g changes with the conditions of glass formation.

In recent years, very sophisticated mathematical models have been developed for heat transfer in various metal forming processes, especially injection moulding. Michael has shown how DSC can provide traceable high temperature data for aluminium alloys with which to test such models. Much of this work has been in cooling, to define fraction solid as a function of temperature, and corrections for thermal lag that were originally developed for work in heating have been essential.

Michael was awarded the NETZSCH-GEFTA Prize in 1994. He is currently Chairman of the ICTAC Committee on Standardization and Treasurer of the UK Thermal Methods Group. For many years he was on the Committee of the UK Polymer Physics Group. Following his retirement from the NPL, he has moved to the Polymer Research Centre at the University of Surrey but there is now more time to devote to a lifelong interest in industrial archaeology—especially anything driven by steam.

Michael married Jan in 1964 and both son David and daughter Susan have children—life in "retirement" can never be dull!