Note

UNUSUAL USE OF THE TERM "DIFFERENTIAL SCANNING CALORIMETER"

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Attention is drawn to a misleading use of the term "Differential Scanning Calorimeter".

In a recent paper [1] D. J. David described a thermal analysis apparatus which he described as a Differential Scanning Calorimeter. His apparatus was based on a thin form differential thermocouple micro-sample holder system in which the differential temperature was plotted against time. That is, it actually used the differential thermal analysis system, and was similar to that referred to as quantitative DTA by some other workers (e.g., [2, 3]).

The claim was made [1] that two types of DSC are recognized, one which is based on differential power, and the other which is based on differential temperature, as the ordinate readout. In fact, only the former system has been recognized as being Differential Scanning Calorimetry, DSC [4]. Of the twelve references in [1] in which theoretical treatments were purported to have discussed aspects of the quantitative capability of apparatus based on differential temperature measurements, only those of David referred to the technique as DSC. In one case it was called quantitative DTA [3].

DSC covers the technique of recording the energy necessary to establish zero temperature difference between a substance and a reference material against either time or temperature as the two specimens are subjected to identical temperature regimes in an environment heated or cooled at a controlled rate. The record represents the amount of heat supplied per unit time [4]. As the apparatus used by David [1] did not have the capability of supplying additional heat to the sample or reference material separately and recording this differential heat, the use of the term DSC is misleading.

The main advantage of the apparatus used by David is that its calibration factor (reciprocal sensitivity) varies linearly with temperature. (The calibration factor of most DTA instruments varies non-linearly with temperature.)

Williams and Wendlandt have reported a DTA apparatus which, by varying the gain with temperature, has a constant calibration factor [5].

References

1. D. J. David, J. Thermal Anal., 3 (1971) 247.
2. D. M. Speros, Thermal Analysis, Vol. 2. edited by R. F. Schwenker, Jr. and P. D. Garn, Academic Press, New York, 1969, p. 1191.
3. G. de Josselin de Long, J. Am. Ceram. Soc., 40 (1957) 42 (not Boersma as quoted in reference 1).
4. R. C. Mackenzie, Differential Thermal Analysis, Vol. 1, Academic Press, London, 1970, p. 6.
5. J. R. Williams and W. W. Wendlandt, Thermal Analysis Vol. 1, edited by H. G. Wiedemann, Birkhauser Verlag, Basel und Stuttgart, 1972, p. 75.

The Nomenclature Committee of the International Confederation for Thermal Analysis (ICTA) have been considering the point raised by Dr. Rogers for some time. After much discussion and international consultation they have recommended that techniques using equipment such as that of David or the differential scanning calorimeter cell of Du Pont be termed *quantitative differential thermal analysis* (or *quantitative DTA*), the term *differential scanning calorimetry (DSC)* being reserved for techniques using power-compensation instruments, as in the original definition (*Talanta*, 1969, 16, 1227–1230). This recommendation has been approved at the Fourth International Conference on Thermal Analysis and Council of ICTA have directed it be published in the *Proceedings* of that Conference (Akadémiai Kiadó, in press).

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