

Differential reaction analysis (DRA)—a technique for obtaining differential thermal analysis data from inert substances: a discussion

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"Differential reaction analysis (DRA)—a technique for obtaining differential thermal analysis data from inert substances" by Zuberi and Kopp describes an application of differential thermal analysis (DTA) in which a sample, which by itself is thermally inactive on DTA, may become thermally active after mixing with another substance.

Zuberi and Kopp have invented a new name—"differential reaction analysis"—for what is essentially only an application of DTA, rather than a new instrumental technique. The new name is misleading in that it suggests that the method involves a comparison between two reactions. It is also inadequate because it does not indicate heating.

In line with the policy of the International Confederation on Thermal Analysis of not proliferating names, I suggest that no new name is needed, but a clause qualifying the name "differential thermal analysis" should be added, similar to those used for other applications such as "constant sensitivity DTA" (Williams and Wendlandt, 1971) and "quantitative DTA" (Speros, 1968). The best description of Zuberi and Kopp's method is probably "reaction DTA," but this term has been used by Barta and Jakubekova (1971) for a very similar, although not identical, application. In their method, the reactant was added to the sample and in some cases a little water, in which cases the sample was dried before DTA. When water was added it was done to facilitate reaction before DTA, so DTA revealed the thermal reactions of the products of the reactions which occurred before DTA, as well as those reactions occurring during DTA. However, in the case of siderite to which potassium hydrogen carbonate was added, the identifying reactions occurred during DTA.

Another similar technique is that described by Bollin and Kerr (1961) in which pairs of substances were

mixed and a DTA run was performed to determine the temperature at which they reacted together, and estimate the extent of reaction. All three methods can be used on a sample which by itself gives no detectable DTA peaks.

Other workers have noted cases of samples which gave no detectable peaks by themselves, but, when mixed with another substance, peaks were observed on DTA (e.g. R. C. Mackenzie, 1970; Barrall and Rogers, 1962), and others have remarked on the feasibility of this technique (e.g. Barta and Jakubekova, 1971).

I suggest that all these methods are very similar, and can be regarded as a single class of application. The name "reaction differential thermal analysis" would be adequate to cover them all.

References

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