

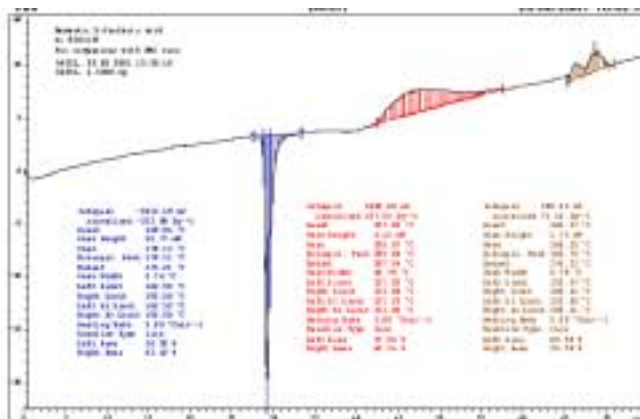
Technical Information Sheet No 102

Tartaric Acid – a Suggested Solid Standard Sample

Tartaric Acid has been considered as a standard for the Accelerating Rate Calorimeter – as a solid material. The data below shows results and problems that arise with use of this chemical.

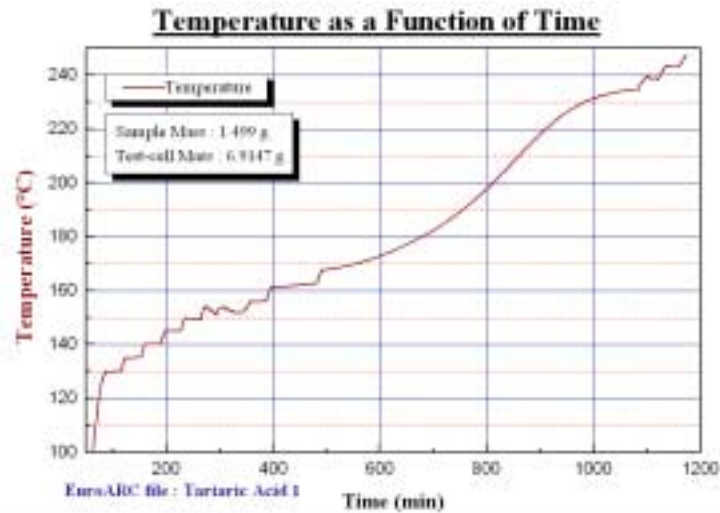
L-Tartaric Acid can be obtained from Sigma-Aldrich at 99.5% purity (product code 251380).

Tartaric has a reported mp of 171-174°C and DSC confirms this. However tests carried out on several Accelerating Rate Calorimeters showed variation in data and melting at a lower temperature.

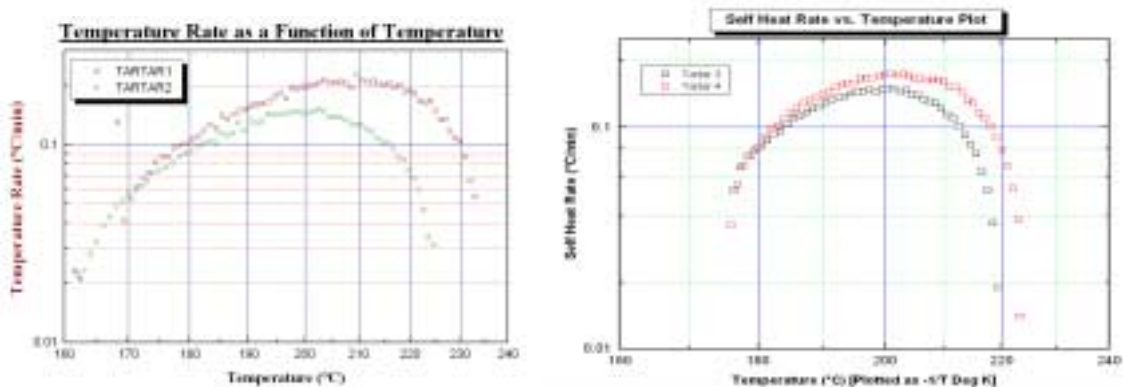


We investigated Tartaric Acid at the request from a customer. The conditions used were those suggested by the customer. This was for a sample and bomb mass to give ϕ near 2.

However, all showed strong endothermic behavior not near the melting point measured by DSC but near 155°C. This is shown in the real time curve below. All Accelerating Rate Calorimetry tests gave a similar result.



The results from two tests carried out with a THT Accelerating Rate Calorimeter are compared in the graph below. The data is shown as a plot of the self-heat rate.



The variation in results is significant – and the data we have obtained agrees fairly well with that obtained by the user – but the agreement between tests is not good. The onset temperature varies by 10-15°C the temperature rise varies by 10-20°C.

The results of 2 tests carried out using a CSI Accelerating Rate Calorimeter are similarly compared. Similar results with similar variation are seen.

The reason for variation in data (and in the melting point) is not easy to determine. It is possible that the solid sample is not fully molten when the exotherm commences –that the exotherm progresses from the endotherm. As such in any test, the amount of residual endothermicity at start of recording of exotherm differs and this affects the SHR data.

The choice of tartaric acid as a solid standard sample is not ideal. It is difficult to suggest an ideal solid standard – any suggestions to info@thermalhazardtechnology.com.