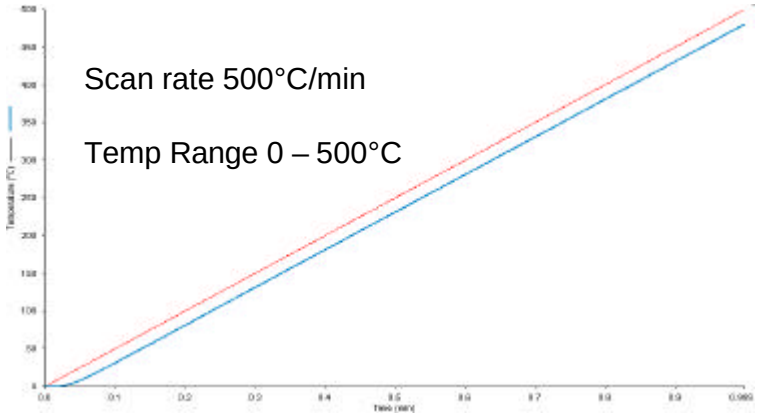
The use of HyperDSC in the study of pharmaceuticals that decompose

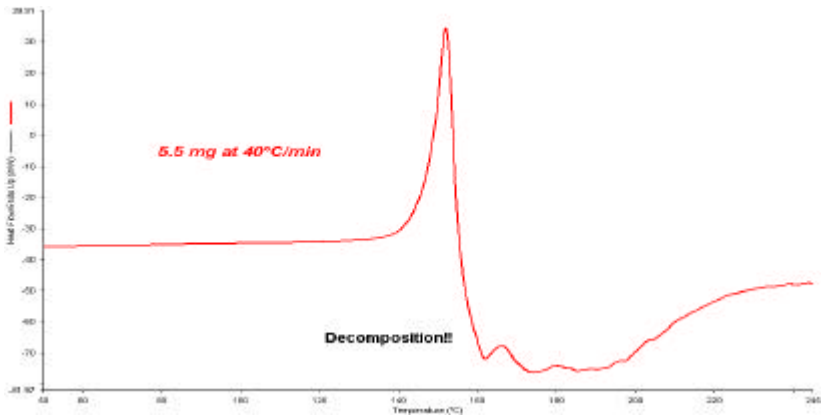
Many Pharmaceuticals undergo decomposition straight after melting , making the full analysis of these materials difficult.

Using HyperDSC it has been found that it is possible to analyse samples that decompose after melting by using scan rates of up to 500°C/min. At these rates it is possible to delay the onset of decomposition and as a consequence it is possible to see the full transitions exhibited by a sample which are normally masked by the decomposition.

HyperDSC allows the use of scan rates upto 500°C/min to analyse the melting behaviour of the materials whilst maintaining control of the heating rate. This is shown in the thermogram below



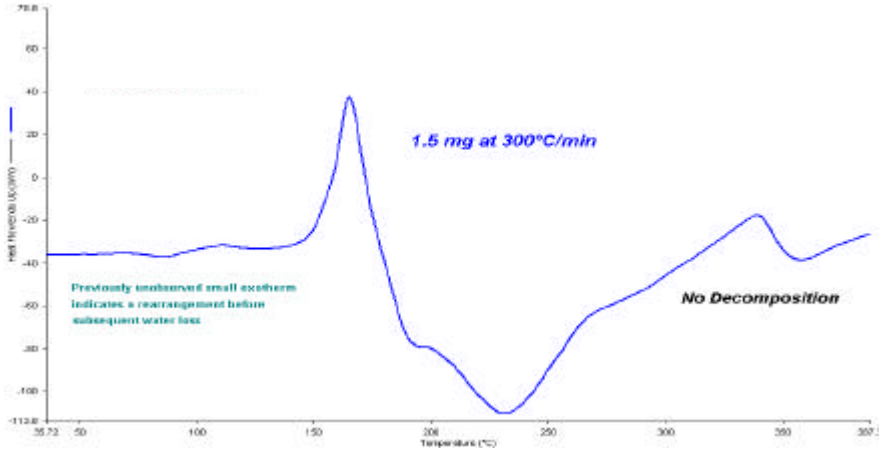
In order to show this effect two samples of Ranitidine were tested. Ranitidine has been shown to decompose shortly after melting at conventional slow scan rates. Scan rates of 40°C/min and 300° C/min were used to analyse the compound and the following thermograms show the analysis of two samples of Ranitidine



A thermogram of the melting profile of Ranitidine at 40°C/min

The thermogram on the previous page shows a sample of ranitidine heated at a scan rate of 40°C/min . The thermogram shows that there is a melting process followed immeadiately by a decomposition of the sample.

A second sample was prepared and scannned at 300°C/min and the thermogram of this sample is shown below



A thermogram of the melting profile of Ranitidine at 300°C/min

At the HyperDSC rate of 300°C/min it has been possible to analyse the sample fully before the sample decomposes. As a consequence we can now see a further recrystallisation and a second melt of the sample.

Because of the high sensitivity and resolution of HyperDSC, it was also possible to see two extra transitions. These transitions were an exothermic transition followed by an endothermic transition at a temperature below the melt and were attributed to a rearrangement followed by a loss of water from the sample. These transitions were not seen at the lower scan rate used previously.

Conclusions

Using a scan rate of 300°C/min, HyperDSC has allowed the study of the melt, a further recrystallisation and re-melt of the sample without decomposition giving a full analysis of the sample. HyperDSC has also allowed the identification of two further transitions that were previously unseen by conventional scan rate analysis.

Acknowlegements

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