

APPLICATION SHEET

DSC Accessories – Special Pt/Al₂O₃ Crucible Sets

Phase Transformation of an Oxygen-Sensitive Material

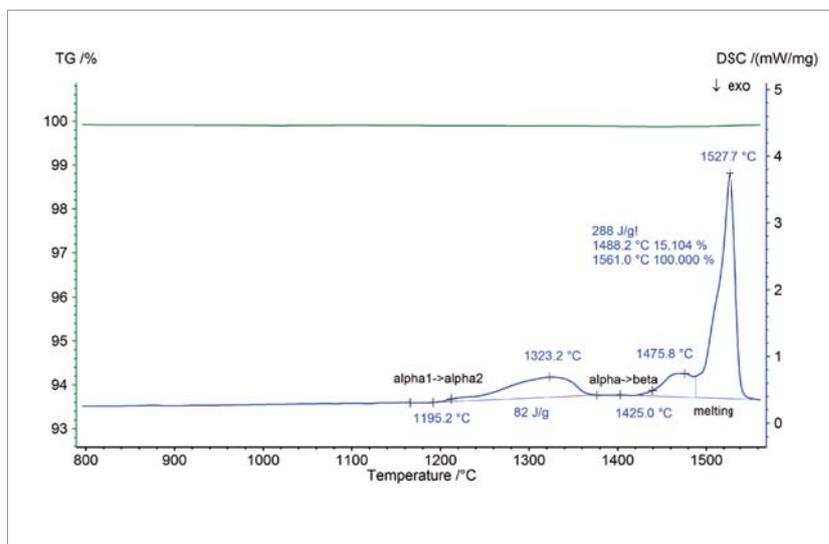
The high performance metal γ -TiAl is resistant to corrosion and high temperatures and has low specific weight. However, it is highly sensitive to oxygen, so DSC measurements have to be carried out in a very pure atmosphere. Additionally, measurement results can be improved by using the right crucible. Metallic crucibles with high thermal conductivities and low time constants cannot be used for metals. In order to maintain the advantages of a Pt crucible and to prevent reaction between the sample and crucible material, a special Pt crucible with an Al₂O₃ liner is available.

The DSC 404 **F3 Pegasus**[®] and STA 449 **F1 Jupiter**[®], with their vacuum-tight design and various sensor and crucible



Reshaping tool for the PtRh crucible, see also *Accessories for Differential Scanning Calorimeters and Thermobalances*

types, completely fulfill all (DSC + STA) measurement requirements for highly oxygen-sensitive materials. In addition, an oxygen trap system (OTS[®]) is available to further reduce oxygen traces in the atmosphere.



Phase transition in γ -TiAl. Only a pure oxygen-free atmosphere leads to well-defined phase transitions at higher temperatures because oxidation of the metal alloy is inhibited, measured with the STA 449 **F1 Jupiter**[®]

The STA measurement was carried out using the Pt/Al₂O₃ crucible system. The DSC curve of γ -TiAl (blue) shows an endothermic effect at a peak temperature of 1323°C. This is due to the $\alpha_2 \rightarrow \alpha$ transition. At 1476°C, the

$\alpha \rightarrow \beta$ transition occurs and is followed by melting of the sample. Further effects cannot be observed which proves the vacuum-tightness of the system and the suitability of the crucible system.