

Changes of the state of aggregation

Melting and solidification

Determining the melting and the solidification temperature/Wood's metal -
Measurement with Sensor-CASSY and CASSY-Display

Object of the experiment

1. Determining the melting and the solidification temperature of Wood's alloy

Setup



- Put Wood's alloy into the test tube.

Apparatus

1 Wood's alloy, 50 g	675 4200
1 Temperature probe, NiCr-Ni, 1.5 mm.....	666 193
1 Temperature box, NiC-Ni/NTC.....	524 045
or	
1 Temperature sensor S, NTC.....	524 044
1 Sensor-CASSY 2.....	524 013
1 CASSY-Display USB	524 020USB
1 Butane gas burner	666 711
1 Butane cartridge, 190 g, set of 3.....	666 712ET3
1 Beaker, Boro 3.3, 400 ml, squat	664 131
1 Test tubes, Fiolax, 30 x 200 mm, set of 10	664 045
1 Stand base, V-shape, small.....	300 02
1 Stand rod, 100 cm, 12 mm diam.....	300 44
2 Leybold multiclamps	301 01
1 Universal clamp 0...80 mm.....	666 555
1 Stand ring with stem, 100 mm diam.....	666 573
1 Wire gauze, 120 x 120 mm	608 120
1 Laboratory scalpels, set of 10.....	667 018ET10
1 Glass rod, 200 mm, 5 mm diam.....	602 782

Carrying out the experiment

- Warm the test tube in a water bath until Wood's alloy starts to melt (you will observe the formation of a metallic-lustrous liquid on the wall of the test tube).

- Read the melting temperature ϑ_m from the display, and take it down.
- Allow Wood's alloy to melt completely.
- Then remove the test tube from the water bath, and stir with the temperature sensor until Wood's alloy starts to solidify (you will observe a metallic dark colouring on the wall of the test tube).
- Read the solidification temperature ϑ_s from the display, and take it down.

Measuring example

Melting temperature ϑ_m in °C	Solidification temperature ϑ_s in °C
68	68

Evaluation

The temperature at which a substance changes from the solid into the liquid state of aggregation is called melting temperature.

The temperature at which a substance changes from the liquid into the solid state of aggregation is called solidification temperature.

The melting and the solidification temperature of a substance are equal.

In the case of Wood's alloy we have: $\vartheta_m = \vartheta_s = 68^\circ\text{C}$.