

SPECORD® PLUS

Applications in Life Science

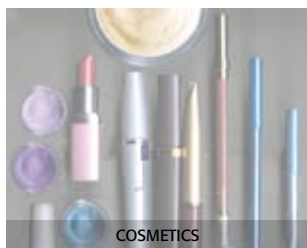


Determination of the DNA melting point

With the effect of heat it is possible to separate DNA strands. The thermal denaturation cuts every interaction between the pairs of bases at the same time. Melting of DNA is the sudden collapse of the double helical structure at a specific temperature, similar to the melting point of crystal- line substances. The double helix melts down to two single strands. The temperature whereat the half of the DNA exists as single strands, is called T_m .

With UV-spectroscopy it is possible to track this process very well, because the absorbance of UV-light is for single-stranded DNA by 40 % higher than for double stranded DNA.

Natural DNA always shows a high melting point of at least 85 °C. The melting point of synthetic DNA is dependent on its GC content (guanine-cytosine content) and its chain length. The higher the GC content and chain length are, the higher is the melting point T_m .



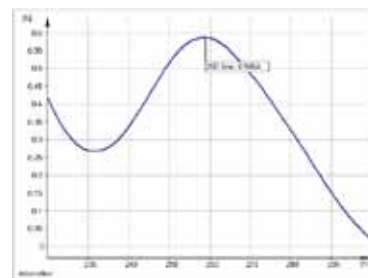
For this sort of analysis a very precise temperature must be assured. This precision can be received best using a Peltier temperature control. This enables an analysis 10 times more precise than temperature control by water.

The peltier element permits a temperature control between -5 and 105 °C with a temperature accuracy of ± 0.1 °C.

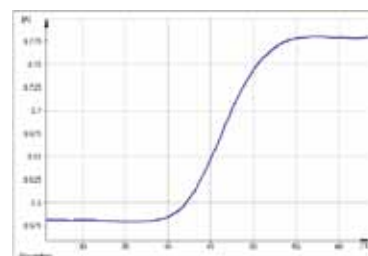
Furthermore the software offers a possibility to vary the heating rate during the measurement. This makes it possible to measure with very small temperature intervals around the expected melting point to increase the accuracy of the measurement.

The integrated internal sensor ensures that the temperature of the sample inside the cell (actual temperature) is equal to the set temperature at the heat exchanger (target temperature) at the time of measurement. By means of this feature, possible errors through the inertia of the system are excluded.

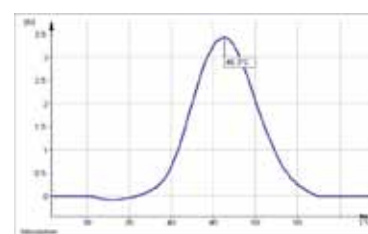
DNA spectra



Melting curve of DNA



First derivative of DNA melting curve/T_m



Recommended instrumentation

Device option	SPECORD® 50 PLUS	822-0050P-2
	SPECORD® 200 PLUS	823-0200P-2
	SPECORD® 210 PLUS	823-0210P-2
	SPECORD® 250 PLUS	823-0250P-2
Accessory option	Peltier cooled cell holder (-5 °C to 105 °C)	820-60263-P
	2 x Peltier cooled cell holder (-5 °C to 105 °C)	820-60265-P
	Peltier cooled cell holder (10 °C to 60 °C)	820-60264-P
	2 x Peltier cooled cell holder (10 °C to 60 °C)	820-60266-P
	Peltier cooled cell holder with external heat exchanging (-10 °C to 105 °C)	820-60248-P
	2 x Peltier cooled cell holder with external heat exchanging (-10 °C to 105 °C)	820-60249-P
Software	WinASPECT® PLUS software includes methods for kinetic analysis in standard software package	

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Subject to changes in design and scope of delivery as well as further technical development!

