

DNA Melting using the One Drop Capillary Jacket Measurement Accessory

Introduction

Thermal melting studies are commonly carried out in biochemical and biotechnology fields in order to obtain information regarding a biological sample's thermodynamic properties. These properties can further elucidate the sample's thermal stability and possible changes in structure and/or binding.

For many biological samples, it is much more convenient, cost effective, and efficient to use microvolumes for structural and quantitative studies. The One Drop capillary jacket accessory uses a disposable quart capillary cell, whose optical pathlength is 0.5 mm and minimum sample volume is 3 μ L.

This application note demonstrates the use of the one drop capillary jacket accessory for biological sample absorption measurements.

Keywords

V-630, UV-Visible/NIR, Microsampling, ETCS-761 Water-cooled Peltier thermostatted cell holder with stirrer, One Drop, Capillary jacket, Biochemistry, Temperature ramping

Experimental

Measurement Conditions			
Measurement Wavelength	260 nm	Data Acquisition Interval	0.1°C
Temperature Gradient	1 °C/min	Response	Fast
Start Setting	3 seconds +/-0.10°C		



V-630
UV-Vis Spectrophotometer

The measurement procedure is illustrated in Figure 1. The sample is drawn into the cell via capillary action and both edges of the capillary cell are sealed which helps to prevent volatilization of the sample. The capillary cell is then inserted into the capillary jacket and placed into a Peltier thermostatted cell holder. The jacket has a temperature sensor insertion port to ensure accurate measurements of the actual sample temperature.

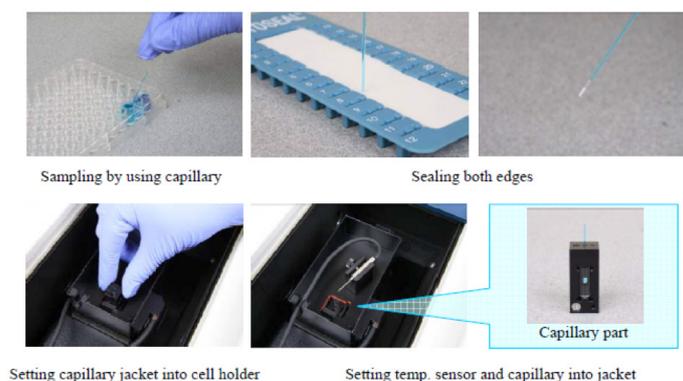


Figure 1. Measurement procedure for filling the capillary cell.

Results

Figure 2 shows the result of measurement of Poly (dA-dT)-Poly(dA-dT). The absorption measurements were obtained in both the 10 mm rectangular cell (green) and the microsampling capillary cell (blue). The calculated melting temperature of Poly (dA-dT)-Poly(dA-dT) was 63.8°C and 63.9°C for the rectangular and capillary cells, respectively.

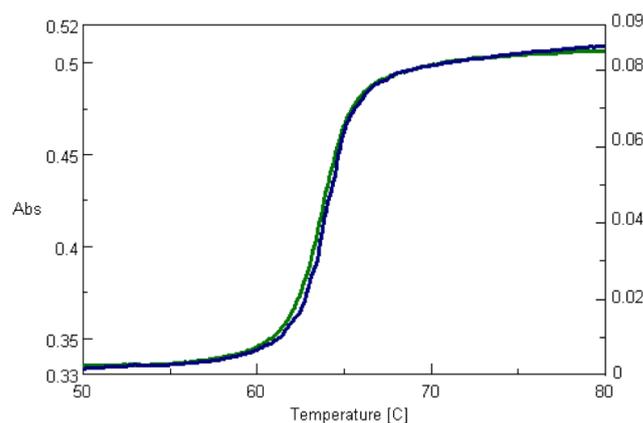


Figure 2. Thermal melting absorption data in a 10 mm rectangular cell (green) and capillary jacketed cell (blue).

Conclusion

The results illustrate that the One Drop capillary cell and jacket are as reliable as the 10 mm rectangular cell for obtaining absorption measurements on extremely small volumes.