



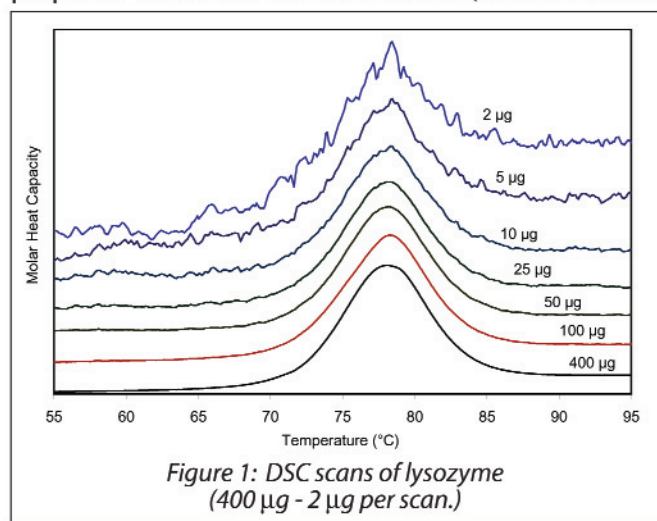
How Much Protein is Required for a DSC Scan?

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Determining the thermodynamic parameters of a protein by differential scanning calorimetry (DSC) using the CSC Nano-DSC III requires about the same amount of protein as surface plasmon resonance or fluorescence studies. Because of the Nano-DSC III's extreme sensitivity and baseline reproducibility, and the sample cell's small volume (300 μL) and capillary configuration (which delays the onset of irreversible protein aggregation and precipitation), a complete, interpretable, accurate scan can be obtained on essentially any protein of interest.

The sensitivity and accuracy of the Nano-DSC III is demonstrated by the following data set. Hen egg white lysozyme (in pH 4.0 glycine buffer) was prepared at various concentrations (concentrations



established by A_{280} , followed by serial dilutions) and scanned at 2 $^{\circ}\text{C}/\text{min}$. A single **unsmoothed** scan at each concentration is shown in Figure 1.

Each data set was analyzed for calorimetric enthalpy (ΔH_{cal}) and entropy (ΔS_{cal}), and the van't Hoff T_M and ΔH_{vH} :

Lysozyme in cell (μg)	Calorimetric		van't Hoff	
	ΔH (kJ mol^{-1})	ΔS ($\text{kJ K}^{-1} \text{mol}^{-1}$)	T_M ($^{\circ}\text{C}$)	ΔH (kJ mol^{-1})
400	512	1.46	78.0	515
100	512	1.46	78.0	509
50	517	1.47	77.9	513
25	513	1.46	77.8	513
10	515	1.47	78.0	515
5	490	1.40	78.1	510
2	503	1.43	77.8	499

Even **2 μg** of lysozyme in the capillary cell is sufficient to provide quality data yielding accurate values of all four thermodynamic parameters.

Using the CSC Nano-DSC III, precise and complete thermodynamic analysis of proteins available in only very limited quantities is now possible.