



Novel Sample Preparation Technique for Testing Biological Tissue Via Differential Scanning Calorimetry

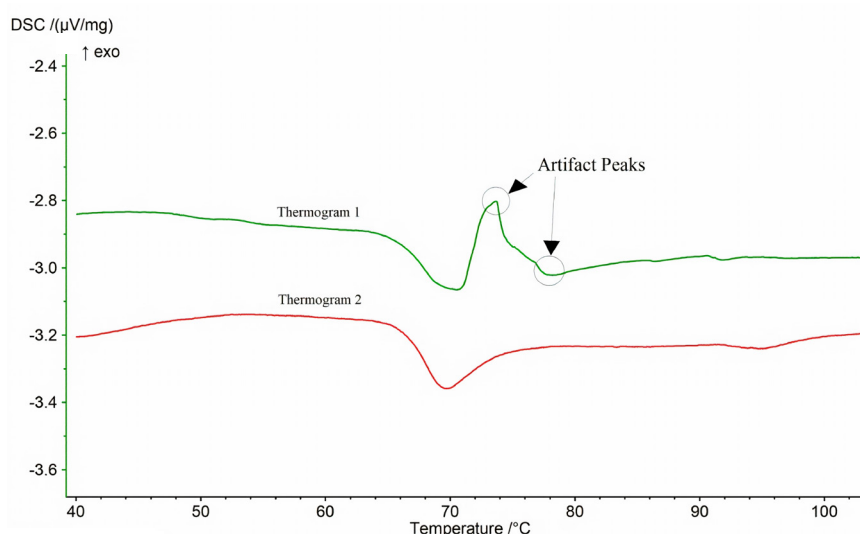
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Differential Scanning Calorimetry (DSC), although not routinely used for biomaterial investigations, may carry value for biological tissue characterization to aid bioengineering and regenerative medicine. A review of the relevant literature had limited discussion on sample preparation and method development to ensure reliable and reproducible DSC results.

This application note describes a novel sample preparation technique for DSC evaluation of biological tissues. Following a systematic approach to identify the critical process parameters for the method, two critical factors

were identified 1) sample sizing to match the internal diameter of the DSC pan and 2) filling the DSC pan headspace with an inert material to prevent heat-induced movement of the sample during measurement.

The figure shows the thermograms from sections of the same biological tissue prepared using two different sample preparation techniques. Thermogram 1 in the figure represents biological tissue prepared by cutting the sample into pieces and placing in the sample pan. Thermogram 2 in the figure represents biological tissue prepared as described above to ensure sample movement is minimized.



Our results demonstrate that a critical parameter in generating accurate, reproducible thermograms for biological tissue is a sample preparation methodology that minimizes heat-induced sample movement. Matching tissue size to the internal diameter of the DSC pan and filling the headspace with an inert material can help prevent artificial signals caused by sample movement in the DSC pan.

1 DSC thermogram overlay showing the effect sample preparation of biological tissue has in eliminating artifact peaks due to sample movement