Slow Scanning Applications and absolute heat capacity determinations

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This presentation will give some application examples of slow temperature scanning microcalorimetry. Slow scanning is here defined as temperature change with a maximum rate of 2 Kh^{-1}. The slow scanning rate will be compensated by the amount of sample, up to 4 gram, as well as high sensitivity of the calorimeter. With this slow change the sample will remain in virtual physical, chemical and thermal equilibrium during the measurement.

Slow scanning microcalorimetry can be used for the study of phase transitions and polymorphism. By using a slow scanning rate successive events as a phase transition before a melting can be detected with a high resolution. There are also examples of a phase transitions detected at much lower temperature when subjected to a slow change in temperature compared to when measured in a traditional DSC.

Another example of the benefits of using a slow very well-controlled temperature change in combination with gram amounts of sample is the determination of absolute heat capacity of a sample. By cycling the temperature in small discrete steps and measuring the heat during this change the absolute heat capacity can be determined with a high precision and accuracy. Preliminary results shows that heat capacities can be determined with an accuracy of better than 0.2 %.