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Characterizing phase change materials using the T-History method: On the factors influencing the accuracy and precision of the enthalpy-temperature curve

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Abstract

While research on using the latent heat of so called phase change materials (PCMs) for thermal energy storage has gained increasing interest in the last decade, the measurement of its thermal properties are still subject to research. The T-History method has been frequently used by researchers to measure the enthalpy-temperature curve of PCMs but the factors influencing its accuracy and precision have rarely been discussed. This work provides a systematic experimental study of an organic PCM based on different insulated sample holders. It is first shown that the data evaluation method has to be adjusted against noise to improve both accuracy and precision for all experimental setups. The results moreover show that neglecting the insulation thermal mass in the experimental setup leads to systematic errors in the enthalpy results due to oversimplification of the mathematical model. This

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