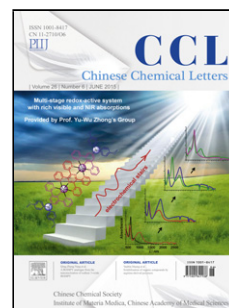


Accepted Manuscript

Title: Applications of low temperature calorimetry in material research

Authors: Xin Liu, Jipeng Luo, Nan Yin, Zhi-Cheng Tan, Quan Shi



PII: S1001-8417(17)30435-7
DOI: <https://doi.org/10.1016/j.ccllet.2017.10.021>
Reference: CCLET 4294

To appear in: *Chinese Chemical Letters*

Received date: 31-8-2017
Revised date: 20-9-2017
Accepted date: 16-10-2017

Please cite this article as: Xin Liu, Jipeng Luo, Nan Yin, Zhi-Cheng Tan, Quan Shi, Applications of low temperature calorimetry in material research, Chinese Chemical Letters <https://doi.org/10.1016/j.ccllet.2017.10.021>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Review

Applications of low temperature calorimetry in material research

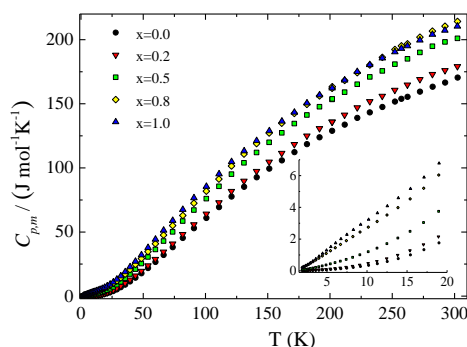
Xin Liu, Jipeng Luo, Nan Yin, Zhi-Cheng Tan, Quan Shi *

Thermochemistry Laboratory, Liaoning Province Key Laboratory of Thermochemistry for Energy and Materials, Dalian National Laboratory for Clean Energy, Dalian Institute of Chemical Physics, Chinese Academy of Sciences, Dalian 116023, China

* Corresponding author.

E-mail address: shiquan@dicp.ac.cn

Graphical abstract



Low temperature calorimetry has been used not only to obtain heat capacity, entropy, enthalpy and Gibbs free energy, but also to investigate and understand lattice vibrations, metals, superconductivity, electronic and nuclear magnetism, dilute magnetic systems and structural transition involved in material research.

ARTICLE INFO

ABSTRACT

Article history:

Received

Received in revised form

Accepted

Available online

Keywords:

Low Temperature Calorimetry

Heat Capacity

Thermodynamics

Physical Propertie

Materials

Low temperature calorimetry is an experimental method of heat capacity measurements, and heat capacity is one of the most important and fundamental thermodynamic properties of substances. The heat capacity can provide an average evaluation of the thermal property of a sample since it is a bulk property of substances. In the other hand, the condensed states of substances could be mainly controlled by the molecular motions, intermolecular interactions, and interplay among molecular structures. The physical property reflected in a material may be closely related to the energy changes in these three factors, which can be directly observed in a heat capacity curve. Therefore, low temperature calorimetry has been used not only to obtain heat capacity, entropy, enthalpy and Gibbs free energy, but also to investigate and understand lattice vibrations, metals, superconductivity, electronic and nuclear magnetism, dilute magnetic systems and structural transitions. In this review, we have presented the concept of low temperature calorimetry and its applications in the related field of material researches, such as nano-materials, magnetic materials, ferroelectric materials, phase change materials and other materials.

1. Introduction

Download English Version:

<https://daneshyari.com/en/article/7693213>

Download Persian Version:

<https://daneshyari.com/article/7693213>

[Daneshyari.com](https://daneshyari.com)