

EXPERIMENTAL DETERMINATION OF
ENTHALPY AND SPECIFIC HEAT

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Experimental determination of Enthalpy and Specific heat

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OBJECTIVES

The physical meaning and thermodynamic definition of Enthalpy and Specific heat must be understood.

The operational principles of TG/DSC apparatus must be understood and its capabilities must be appreciated.

The mechanism that leads to the indirect calculation of specific heat and enthalpy must be understood.

INTRODUCTION

How does matter behave?

Scientific understanding of this question began to emerge when Sir Francis Bacon suggested that we examine the behavior of matter in our attempt to explain its behavior, rather than accepting mystical explanations handed down from the ancients.

By the nineteenth century this mechanical description of the behavior of matter was well established, but it was also becoming evident that this view was incomplete.

Mechanics recognized that the behavior of matter could be described in terms of other fundamental ideas, one associated with the motion of matter, the other associated with its position in a potential field and the influence of heat, which is of our interest.

It also became evident that a system could be made to expand and contract by supplying or removing heat. The idea of pressure in such a system served to quantify this aspect of the behavior of matter.

The realization that these various influences could be converted from one form to another set the basics for a general description of the behavior of matter. The observation that heat from the fire was produced by matter conversions, recognized to be chemical changes, added another class of influences capable of changing the condition of matter.

Therefore, enthalpy and specific heat, along with their accurate measurement are very important aspects of thermodynamics.

In Chapter 1 the reader will be informed about enthalpy and specific heat in detail.

In Chapter 2 the laws of thermodynamics are explained so that combined with Chapter 3 (thermodynamic variables and relations) one can derive or manipulate any equation needed.

Finally, in Chapter 4 the DSC (Differential Scanning Calorimetry) machine and its operations are explained as well as the proper setup of an experiment.

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