

Heat and Heat Changes Encyclopedia Article

Heat and Heat Changes by Bill Buford

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Heat and Heat Changes

Heat is the **energy** exchanged when a difference in **temperature** exists between two regions. That is to say, changes in temperatures are produced by the addition or subtraction of heat from a substance.

In general, the more heat that is added to a particular body of **matter**, the more the temperature of that body rises. When heat is added to or removed from a physical system, the accompanying thermal changes may include a change in length and **volume**, and/or changes in physical states such as melting, evaporation, etc. The addition or removal of heat from a material may destroy the magnetic, superconductive, ferroelectric, shear, and/or cohesive properties of that material, and it may profoundly affect the mechanical properties of **solids**, fluidity of **liquids**, the **electrical conductivity** of **metals**, and the thermal conductivity of solids.

During the eighteenth century, heat was believed to be a fluid, called the caloric, that filled the space between the fundamental particles of matter. Once it was recognized that friction produces heat and that heat can be dissipated when mechanical work is performed, heat was viewed as another form of energy.

When physical changes in a body accompany the addition or removal of heat from that body, finite quantities of heat may be absorbed over an infinitesimal temperature range (at constant pressure), resulting in a change of phase. The heat absorbed at constant pressure per **mole** when a solid melts is referred to as the heat of melting. The **heat of vaporization** is the heat absorbed at constant pressure per mole when a liquid vaporizes. And the **heat of sublimation** is the heat absorbed at constant pressure per mole when the solid vaporizes.