THERMAL PROPERTIES OF MATTER

MEASURMENT OF TEMPERATURE

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Temperature scales, such as Celsius and Fahrenheit, are based on thermometric properties, which are physical properties that change with temperature. One common example is the mercury thermometer, consisting of a glass bulb and tube containing a fixed amount of mercury. When exposed to heat, the mercury expands, causing an increase in the length of the mercury column.

To establish a temperature scale, the mercury thermometer is placed in equilibrium with ice and water at a pressure of 1 atm, marking the position of the mercury column at the ice point temperature. Subsequently, the thermometer is immersed in boiling water at the same pressure, and the new position of the mercury column is marked as the steam point temperature.

- **1.** Celsius Scale: Created by Andre Celsius in 1742, this scale defines the ice point temperature as 0°C and the steam point temperature as 100°C. The range between 0°C and 100°C is evenly divided into 100 intervals.
- **2.** Fahrenheit Scale: Designed by Fahrenheit in 1717, this scale sets the ice-point temperature at 32°F and the steam point temperature at 212°F. The interval between 32°F and 212°F is divided into 180 equal parts.
- **3.** Relation between Celsius and Fahrenheit temperature (t): Given that there are 100 Celsius degrees and 180 Fahrenheit degrees between the ice and steam points, a conversion formula is derived. To convert Celsius (tc) to Fahrenheit (tf), the following formula is applied:

$$t_F = \frac{9}{5} t_C + 32$$

The normal human body temperature, measured on the Celsius scale, is 37°C, which is equivalent to 98.6°F when converted to the Fahrenheit scale using the conversion formula.