Calorimetry &

Change of State

\[ Q = m s \Delta \theta = C \Delta \theta \]  (temp. change without change of state).

\[ Q = mL \]  (state change).

\( S \rightarrow \) specific heat, heat required to increase temp. of unit mass by 1°C or 1 K.

\( C \rightarrow \) heat capacity, = ms, heat required to increase temp. by 1°C or 1 K.

\( S \) for water = 1 cal/g °C.

\( L \rightarrow \) latent heat, heat required to convert unit mass from one state to another.

Water equivalent: Mass of equivalent water that takes same amount of heat as taken by the vessel for same rise of temp.

\[ \frac{d\theta}{dt} = \frac{\Delta \theta}{R_h} = \frac{\Delta \theta}{\frac{1}{K} A} \]  [conduction process]

\[ \frac{dQ}{dt} = mc \frac{\Delta \theta}{\Delta t} = L \frac{dm}{dt} = \frac{\Delta \theta}{R_h} \]  \( R_h \rightarrow \) thermal resistance.

While temp. rising

While change of state