Which of the following statements about enthalpy is incorrect?

Enthalpy and internal energy of a system are always identical

Enthalpy is a state function

ΔH is the enthalpy change at constant pressure

Reactions which absorb heat have a positive ΔH

Answer

First statement (Enthalpy and internal energy of a system are always identical) is incorrect.

Enthalpy and internal energy of a system are not always identical,

As $\Delta H_{rxn} = \Delta U_{rxn} + P\Delta V_{rxn}$,

where ΔH is enthalpy change,

ΔU – change in internal energy of the system (reaction),

PΔV – pressure-volume work.

Enthalpy and internal energy are equal in the case when reaction takes place at constant volume, where no work of expansion is done:

V=const, $\Delta H_{rxn} = \Delta U_{rxn.}$