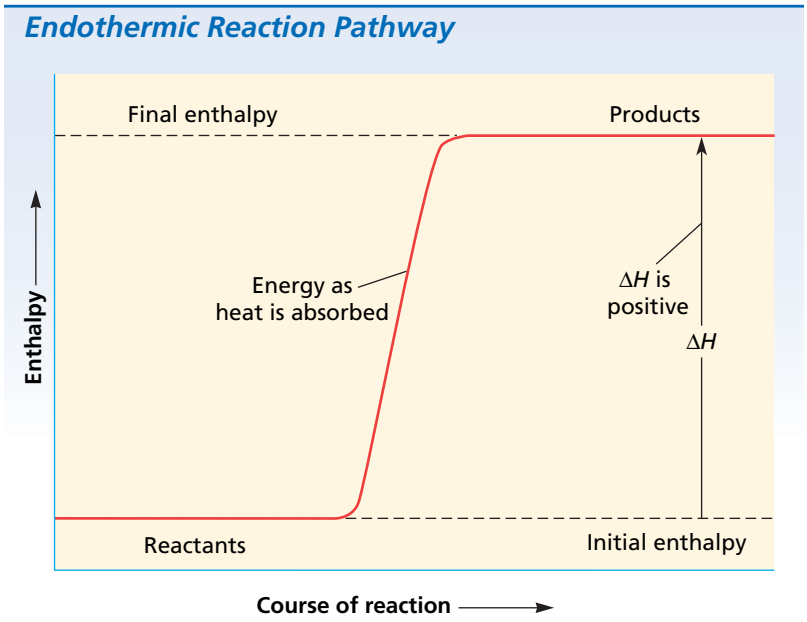

FIGURE 3 In an endothermic chemical reaction, the enthalpy change is positive because energy is absorbed into the system as heat.

the reactants is lower than the final enthalpy of the products. In this case, ΔH is designated as positive.

Keep in mind the following when using thermochemical equations.

1. The coefficients in a balanced thermochemical equation represent the numbers of *moles* of reactants and products and never the numbers of *molecules*. This allows us to write these coefficients as fractions rather than whole numbers when necessary.
2. The physical state of the product or reactant involved in a reaction is an important factor and therefore must be included in the thermochemical equation.
3. The change in enthalpy represented by a thermochemical equation is directly proportional to the number of moles of substances undergoing a change. For example, if 2 mol of water are decomposed, twice as much enthalpy, 483.6 kJ, is needed than for the decomposition of 1 mol of water.
4. The value of the enthalpy change, ΔH, is usually not significantly influenced by changing temperature.

Enthalpy of Formation

The formation of water from hydrogen and oxygen is a composition reaction—the formation of a compound from its elements in their standard form. Thermochemical data are often recorded as the enthalpies of such composition reactions. *The* **molar enthalpy of formation** *is the enthalpy change that occurs when one mole of a compound is formed from its elements in their standard state at 25°C and 1 atm.*