

Standard Enthalpy of Hydration Definition

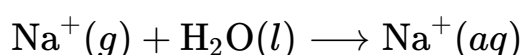
<https://gemini.google.com/app/7cb53e4f4159507a>

Response: The correct option is **(3)**.

Explanation

The **standard enthalpy of hydration** ($\Delta H_{\text{hyd}}^{\circ}$) of an ion is defined as the enthalpy change when **1 mole of gaseous ions** is completely dissolved in water to form an **infinitely dilute aqueous solution** under standard conditions.

For the sodium ion (Na^{+}), the chemical equation representing this definition is:



- **Reactant:** 1 mole of gaseous sodium ions, $\text{Na}^{+}(g)$, interacting with liquid water, $\text{H}_2\text{O}(l)$.
- **Product:** Hydrated sodium ions in aqueous state, $\text{Na}^{+}(aq)$.

Therefore, option **(3)** correctly represents this thermochemical process.
