

BR:2-14

Substance	Formula	$\Delta H'_{\text{vap}}$ (kJ/mol)	$\Delta H'_{\text{fus}}$ (kJ/mol)
Water	H ₂ O	40.7	6.01
Ethanol	C ₂ H ₅ OH	38.6	4.94
Methanol	CH ₃ OH	35.2	3.22
Acetic acid	CH ₃ COOH	23.4	11.7
Ammonia	NH ₃	23.3	5.66

1. How much heat is released when 38.6 g of water melts?
 $38.6 \text{ g} \times \frac{1 \text{ mol}}{18 \text{ g}} \times \frac{6.01 \text{ kJ}}{1 \text{ mol}} = 12.88 \text{ kJ}$

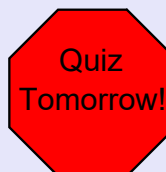
2. Determine the change in enthalpy for the reaction below:
 Value for C₆H₁₂O₆ is -1273.3 kJ/mol
 $6\text{CO}_2 + 6\text{H}_2\text{O} (\text{l}) \rightarrow \text{C}_6\text{H}_{12}\text{O}_6 + 6\text{O}_2$
 $(-1273.3 + 0) - (6 \cdot -393.5 + 6 \cdot -285.8) = 2802.5 \text{ kJ/mol}$

Jan 21-9:04 AM

Thursday, February 14th

Objective: Students will understand the difference between enthalpy and entropy

1. Bellringer
2. Entropy Notes
3. Lab Questions



DUE: Exothermic and Endothermic Lab
 HW: Entropy Practice

Jan 21-8:46 AM

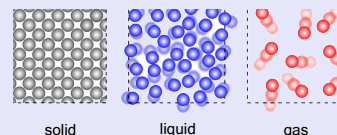
2nd Law of Thermodynamics

- Entropy (S) is a measure of the disorder or randomness of the particles that make up a system.
- Entropy is the driving force in all spontaneous processes.
crazy, random occur on their own
- The law of disorder: spontaneous processes proceed in a way that the disorder of the universe increases.
- Entropy is all about probability.
- This is the Second Law of Thermodynamics.

Feb 16-8:07 AM

Measuring Entropy

- Change of state.
 - > What state has the most entropy??
gas
 - Solids dissolving to form a solution.
 - > solutions have more entropy than solids and liquids.
- * $s < l < \text{aq (solution)} < g$



Feb 16-8:07 AM

Measuring Entropy

- Big particles broken down into little pieces - entropy increases
 - > $\text{CaCO}_3(\text{s}) \rightarrow \text{CaO}(\text{s}) + \text{CO}_2(\text{g})$
 - > more parts = more entropy
- Spreading out gases.
 - > great volume = greater entropy

Feb 22-7:07 AM

Calculating Entropy

$$\Delta S = \sum \Delta S_f(\text{products}) - \sum \Delta S_f(\text{reactants})$$

What it means:

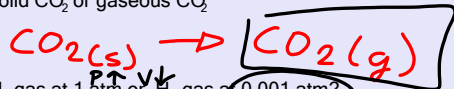
- > $-\Delta S$ = getting more ordered
- > $+\Delta S$ = getting more disordered

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Practice

Which has more entropy?

- solid CO₂ or gaseous CO₂

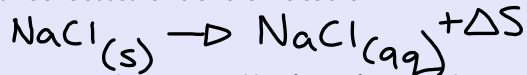


- H₂ gas at 1 atm or H₂ gas at 0.001 atm?

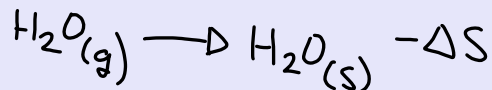
n same P ↓ V ↑
T same

Predict the sign of the entropy change:

- Solid NaCl is added to water to form a solution.



- Water vapor condenses on a cold surface to form crystals.

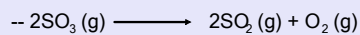


Feb 16-8:07 AM

Practice

Which has more entropy?

- A solution of potassium nitrate or solid potassium nitrate?

What is the sign of the change in entropy?

+ΔS

Feb 16-8:07 AM

Endo/Exo Lab Questions

front

back

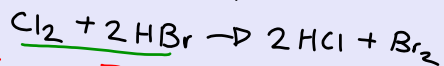
2, 6, 4

$$\textcircled{2} \quad \Sigma P - \Sigma R$$

$$\textcircled{4} \quad \text{''}$$

$$\textcircled{6} \quad \text{HCl} \quad -92$$

$$\text{HBr} \quad -36.4$$




$$[2(-92)] - [2(-36.4)]$$

$$-184 + 72.8 = -111.2 \text{ kJ/mol}$$

Feb 15-8:22 AM

Worktime: Entropy Practice



Quiz
Tomorrow!

Feb 15-8:22 AM