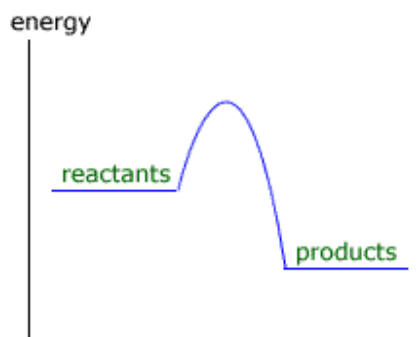


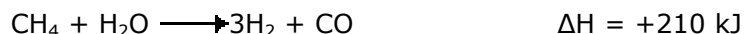
Exercise 4.23 – Reaction enthalpy

Q423-01 According to the enthalpy level diagram below, what is the sign for ΔH and what term is used to refer to the reaction?



- | | ΔH | reaction |
|----|------------|-------------|
| A. | positive | endothermic |
| B. | negative | exothermic |
| C. | positive | exothermic |
| D. | negative | endothermic |

Q423-02 An equation for a reaction in which hydrogen is formed is:



Which energy change occurs when 1 mole of hydrogen is formed in this reaction?

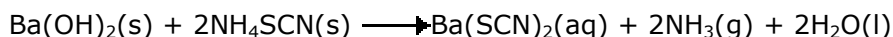
- A. 70 kJ of energy are absorbed from the surroundings
- B. 70 kJ of energy are released to the surroundings
- C. 210 kJ of energy are absorbed from the surroundings
- D. 210 kJ of energy are released to the surroundings

Q423-03 Which statements are correct for an endothermic reaction?

- I - The system absorbs heat
- II - The enthalpy change is positive
- III - The bond enthalpy total for the reactants is greater than for the products

- A. I and II only
- B. I and III only
- C. II and III only
- D. I, II and III

Q423-04 When the solids $\text{Ba}(\text{OH})_2$ and NH_4SCN are mixed a solution is produced and the temperature drops.



Which statement about the energetics of this reaction is correct?

- A. The reaction is endothermic and ΔH is negative
- B. The reaction is endothermic and ΔH is positive
- C. The reaction is exothermic and ΔH is negative
- D. The reaction is exothermic and ΔH is positive

Exercise 4.23 – Reaction enthalpy

Q423-05 Which statement about exothermic reactions is not correct?

- A. They release energy
- B. The enthalpy change (ΔH) is negative
- C. The products have a greater enthalpy than the reactants
- D. The products are more stable than the reactants

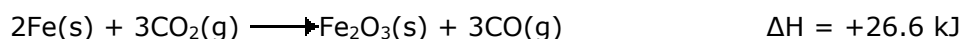
Q423-06 Which statement is correct for an endothermic reaction?

- A. The products are more stable than the reactants and ΔH is positive.
- B. The products are less stable than the reactants and ΔH is negative.
- C. The reactants are more stable than the products and ΔH is positive.
- D. The reactants are less stable than the products and ΔH is negative.

Q423-07 When solid ammonium nitrate, $\text{NH}_4\text{NO}_3(\text{s})$ is dissolved in water the temperature decreases. Which statement about the dissolution process of ammonium nitrate in water is correct?

- A. It is endothermic with ΔH greater than zero
- B. It is endothermic with ΔH less than zero
- C. It is exothermic with ΔH greater than zero
- D. It is exothermic with ΔH less than zero

Q423-08 Which statement about this reaction is correct?



- A. 26.6 kJ of heat are released for every mole of Fe reacted
- B. 26.6 kJ of heat are absorbed for every mole of Fe reacted
- C. 53.2 kJ of heat are released for every mole of Fe reacted
- D. 13.3 kJ of heat are absorbed for every mole of Fe reacted

Q423-09 Excess thionyl chloride, SOCl_2 , can be removed from a reaction mixture by reacting it with water according to the equation:

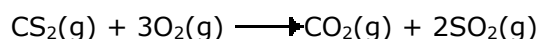


Use the following data to calculate ΔH for this reaction.

| | $\text{SOCl}_2(\text{l})$ | $\text{H}_2\text{O}(\text{l})$ | $\text{HCl}(\text{g})$ | $\text{SO}_2(\text{g})$ |
|---------------------------|---------------------------|--------------------------------|------------------------|-------------------------|
| $H_f(\text{kJ mol}^{-1})$ | - 245.6 | - 285.8 | - 92.3 | - 296.8 |

- A. 142.3
- B. 50.0
- C. + 50.0
- D. + 142.3

Q423-10 What is ΔH for the reaction below in kJ?



[$\Delta H_f / \text{kJ mol}^{-1}$; $\text{CS}_2(\text{g})$: 110, $\text{CO}_2(\text{g})$: -390, $\text{SO}_2(\text{g})$: -290]

- A. -570
- B. -790
- C. -860
- D. -1080