**Stoichiometry and ∆H**

1. Write the equivalences that this balanced thermochemical equation implies.

 PCl3(g) + Cl2(g) → PCl5(g) Δ*H* = −87.9 kJ

1. Write the equivalences that this balanced thermochemical equation implies.

 2 SO3(g) → 2 SO2(g) + O2(g) Δ*H* = 197.9 kJ

1. How many kilojoules are given off when 17.8 mol of CH4(g) react?

 CH4(g) + 2 O2(g) → CO2(g) + 2 H2O(ℓ) Δ*H* = −890.1 kJ

1. How many kilojoules are absorbed when 0.772 mol of N2(g) reacts?

 N2(g) + 2 NO(g) → 2 N2O(g) Δ*H* = 73.8 kJ

1. How many kilojoules are absorbed when 23.09 mol of C6H6(ℓ) are formed?

 6 C(s) + 3 H2(g) → C6H6(ℓ) Δ*H* = 49.0 kJ

1. How many kilojoules are given off when 8.32 mol of Mg react?

 2 Mg(s) + O2(g) → 2 MgO(s) Δ*H* = −1,213 kJ

1. Glucose is the main fuel metabolized in animal cells:

 C6H12O6 + 6 O2 → 6 CO2 + 6 H2O Δ*H* = −2,799 kJ

 How much energy is given off when 100.0 g of C6H12O6 react?

1. Given the thermochemical equation,

 2 Al(s) + Fe2O3(s) → Al2O3(s) + 2 Fe(s) Δ*H* = −850.2 kJ

 how much energy is given off when 288 g of Fe are produced?

1. Given the thermochemical equation,

 2 CO2(g) → 2 CO(g) + O2(g) Δ*H* = 566 kJ

 how much energy is absorbed when 85.2 g of CO2 are reacted?

1. Given the thermochemical equation,

 2 Na+(aq) + SO42−(aq) → Na2SO4(s) Δ*H* = 819.8 kJ

 how much energy is absorbed when 55.9 g of Na+(aq) are reacted?

1. NaHCO3 decomposes when exposed to heat:

 2 NaHCO3(s) → Na2CO3(s) + CO2(g) + H2O(ℓ) Δ*H* = 91.5 kJ

 What mass of NaHCO3 is decomposed by 256 kJ?

1. HgO decomposes when exposed to heat:

 2 HgO(s) → 2 Hg(ℓ) + O2(g) Δ*H* = 181.6 kJ

 What mass of O2 can be made with 100.0 kJ?

1. For the thermochemical equation,

 Fe2O3(s) + 3 SO3(g) → Fe2(SO4)3 (s) Δ*H* = −570.2 kJ

 what mass of SO3 is needed to generate 1,566 kJ?

1. For the thermochemical equation,

 H2(g) + Br2(ℓ) → 2 HBr(g) Δ*H* = −72.6 kJ

 what mass of HBr will be formed when 553 kJ of energy are given off?

Answers

**1.**

1 mol of PCl3 ⇔ 1 mol of Cl2 ⇔ 1 mol of PCl5 ⇔ −87.9 kJ

**3.**

15,800 kJ

**5.**

1,130 kJ

**7.**

1,554 kJ

**9.**

548 kJ

**11.**

470 g

**13.**

6.60 × 102 g