

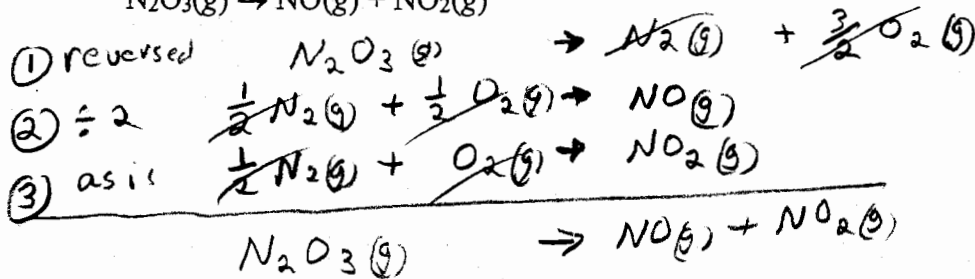
1. Which of the following has a standard enthalpy of formation value of zero at 25°C?

- A) O₂(s)
- B) O(g)
- C) O₂(g)**
- D) O₃(g)
- E) O₂(l)

2. Given:

- ① N₂(g) + $\frac{3}{2}$ O₂(g) → N₂O₃(s); ΔH = 83.7 kJ
- ② N₂(g) + O₂(g) → 2NO(g); ΔH = 180.4 kJ
- ③ $\frac{1}{2}$ N₂(g) + O₂(g) → NO₂(g); ΔH = 33.2 kJ

what is ΔH for the following reaction?



ΔH (kJ)
 -83.7
 90.2
 33.2
ΔH = 39.7 kJ

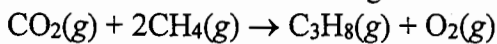
3. Consider the following metals.

Metal	Specific Heat
copper	0.385 J/(g · °C)
magnesium	1.02 J/(g · °C)
mercury	0.138 J/(g · °C)
silver	0.237 J/(g · °C)
lead	0.129 J/(g · °C)

Lowest specific heat.

If the same amount of heat is added to 25.0 g of each of the metals, which are all at the same initial temperature, which metal will have the highest final temperature?

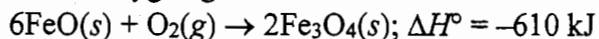
4. What is ΔH° of the following reaction?



Substance	ΔH _f ° (kJ/mol)
CO ₂ (g)	-393.5
CH ₄ (g)	-74.9
C ₃ H ₈ (g)	-104.7

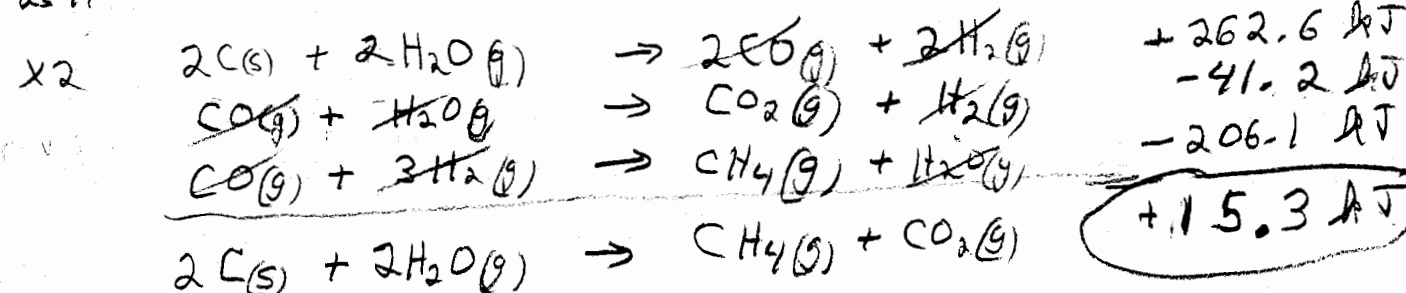
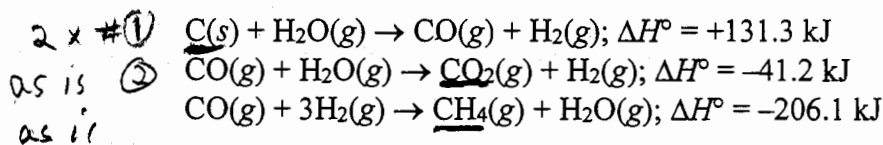
ΔH_{rxn} = Σ n ΔH_{prod} - Σ n ΔH_{react}
 [(-104.7) + (0)] - [(-393.5) + 2(-74.9)]
438.6 kJ

5. What is the change in enthalpy at 25°C and 1 atm for the reaction of 2.0 mol of iron(II) oxide with excess oxygen gas?



$$\frac{2.0 \text{ mol FeO}}{6 \text{ mol FeO}} \times \frac{-610 \text{ kJ}}{1} = -203 \text{ kJ}$$

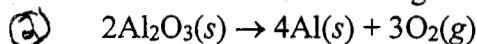
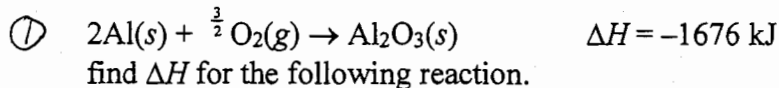
6. Using the following data, calculate the standard enthalpy of reaction for the coal gasification process $2\text{C}(s) + 2\text{H}_2\text{O}(g) \rightarrow \text{CH}_4(g) + \text{CO}_2(g)$.



7. Which of the following reactions corresponds to the thermochemical equation for the standard enthalpy of formation of solid lead (II) nitrate?

- A) $\text{Pb}^{2+}(aq) + 2\text{NO}_3^-(aq) \rightarrow \text{Pb}(\text{NO}_3)_2(s)$
 B) $\text{Pb}(s) + 2\text{HNO}_3(aq) \rightarrow \text{Pb}(\text{NO}_3)_2(s) + \text{H}_2(g)$
 C) $\text{Pb}(\text{OH})_2(s) + 2\text{HNO}_3(aq) \rightarrow \text{Pb}(\text{NO}_3)_2(s) + 2\text{H}_2\text{O}(l)$
 D) $\text{Pb}(s) + 2\text{N}(g) + 6\text{O}(g) \rightarrow \text{Pb}(\text{NO}_3)_2(s)$
 E) $\text{Pb}(s) + \text{N}_2(g) + 3\text{O}_2(g) \rightarrow \text{Pb}(\text{NO}_3)_2(s)$

8. Given the thermochemical equation



2 is #1 reversed and doubled.

so $\Delta H = 2(+1676) = 3352 \text{ kJ}$