

## Answer on Question# 57952 - Chemistry - Inorganic Chemistry

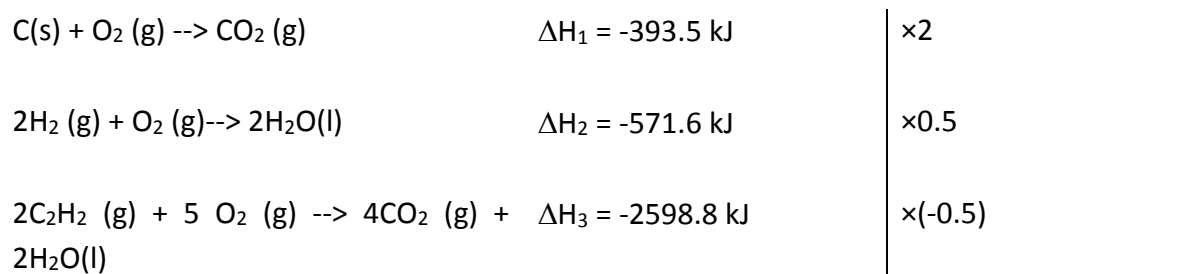
1. From the following heats of reactions that are given:  $C(s) + O_2(g) \rightarrow CO_2(g)$   $\Delta H = -393.5$  kJ  
 $2H_2(g) + O_2(g) \rightarrow 2H_2O(l)$   $\Delta H = -571.6$  kJ  $2C_2H_2(g) + 5O_2(g) \rightarrow 4CO_2(g) + 2H_2O(l)$   $\Delta H = -2598.8$  kJ  
 Calculate the heat of the reaction of the following equation:  $2C(s) + H_2(g) \rightarrow C_2H_2(g)$

2. Calculate the  $\Delta H_{rxn}$  for the following reaction:  $2Al(s) + Fe_2O_3(s) \rightarrow 2Fe(s) + Al_2O_3(s)$  Given that: I.  $2Al_2O_3(s) \rightarrow 4Al(s) + 3O_2(g)$   $\Delta H = +3339.6$  kJ II.  $4Fe(s) + 3O_2(g) \rightarrow 2Fe_2O_3(s)$   $\Delta H = -1644.4$  kJ

3. Nitrogen can exist as  $N_2O$ ,  $NH_3$ ,  $NO$  and  $NO_2$ . In which compound is nitrogen in its lowest oxidation state?

### Solution

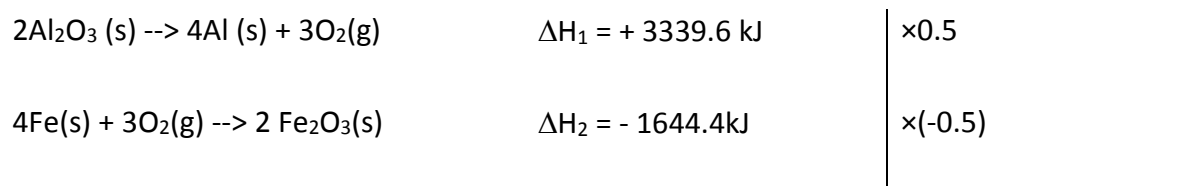
1.



$$2C(s) + H_2(g) \rightarrow C_2H_2(g) \quad \Delta H = 2\Delta H_1 + 0.5\Delta H_2 - 0.5\Delta H_3$$

$$\Delta H = 2(-393.5) + 0.5(-571.6) - 0.5(-2598.8) = \mathbf{226.6 \text{ kJ}}$$

2.



$$2Al(s) + Fe_2O_3(s) \rightarrow 2Fe(s) + Al_2O_3(s) \quad \Delta H = 0.5\Delta H_1 - 0.5\Delta H_2$$

$$\Delta H = 0.5(3339.6) - 0.5(-1644.4) = \mathbf{2492 \text{ kJ}}$$

3.

Compound	Nitrogen oxidation state
$N_2O$	+1
<b><math>NH_3</math></b>	<b>-3</b>
$NO$	+2
$NO_2$	+4

The lowest oxidation state of Nitrogen is in **ammonia**.