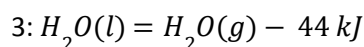
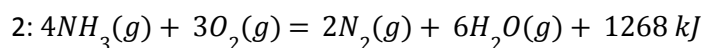
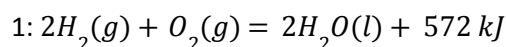


Enthalpy Change

-2006 III(1)

Use equations 1-3 provided below to find the heat Q (kJ) of the thermochemical equation (A).

Thermochemical equation (A): $2H_2(g) + O_2(g) = 2NH_3(g) + Q \text{ kJ}$



-2012 II

II Give the appropriate values for (a) and (b) in the sentences below.

1 mol of graphite is completely oxidized to carbon dioxide while evolving 394 kJ of heat, and 1 mol of carbon monoxide is completely oxidized to carbon dioxide while evolving 283 kJ of heat. At 0 °C, under 1 atm, (a) L of oxygen is required to oxidize 1 mol of graphite to carbon monoxide with the heat evolution of (b) kJ.

-2013 II

II Give the appropriate values for (a) and (b) in the sentences below.

Complete oxidation of 1 mol of methane requires (a) L of oxygen at 0 °C, under 1 atm. The heat of formation of methane is calculated to be (b) kJ mol⁻¹ using following values; bonding energy of a hydrogen molecule : 432 kJ mol⁻¹, bonding energy of a C-H bond in methane : 414 kJ mol⁻¹, sublimation energy of carbon (graphite) : 717 kJ mol⁻¹.

-2017 IV(2)

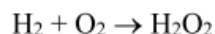
(2) A crystalline silicon adopts a diamond-type structure. The number of Si atom covalently bonded to one Si atom in the crystalline silicon is (c). The energy required for breaking the bonds in crystalline silicon to convert the crystal into Si atoms is 439 kJ mol⁻¹, and the bond energies for Si-H and H-H bonds are 318 and 436 kJ mol⁻¹, respectively. Hence, the heat of formation for SiH₄(g) is evaluated to be (d) kJ mol⁻¹.

-2018 IV(1)(a)

(1) Heat of 11.6 kJ was released when 11.2 g of KOH was completely dissolved in water. The heat of solution is (a) kJ mol^{-1} . Water was more added to adjust 2.0 L of KOH solution.

-2019 IV(1)

(1) The dissociation energies of H_2 and O_2 are 436 kJ mol^{-1} and 498 kJ mol^{-1} , respectively, and the bond energy of O–H bond is 463 kJ mol^{-1} . The heat of vaporization for water (liquid) is 44.0 kJ mol^{-1} . Therefore, the heat of formation for water (liquid) is (a) kJ mol^{-1} . Furthermore, hydrogen reacts with oxygen to form gaseous hydrogen peroxide as follows:



In the above reaction, 142 kJ mol^{-1} is released as heat. Hence, the bond energy of O–O bond in the hydrogen peroxide molecule is (b) kJ mol^{-1} .