19. Consider the following reaction between zinc and oxygen and choose the correct options out of the options given below :

$2\ Zn\ (s) + O_2\ (g) \longrightarrow 2\ ZnO\ (s)$; $\Delta H = -693.8\ kJ\ mol^{-1}$

(i) The enthalpy of two moles of ZnO is less than the total enthalpy of two moles of Zn and one mole of oxygen by 693.8 kJ.

(ii) The enthalpy of two moles of ZnO is more than the total enthalpy of two moles of Zn and one mole of oxygen by 693.8 kJ.

(iii) 693.8 kJ mol^{-1} energy is evolved in the reaction.

(iv) 693.8 kJ mol^{-1} energy is absorbed in the reaction.

Solution:

As enthalpy of reaction is negative, enthalpy of product is less than the enthalpy of the reactants. Hence (i) is correct. The negative value of heat of the reaction suggests, heat is being removed from the system, hence (iii) is correct.