Question # 78484, Chemistry / General Chemistry

What is the ΔHo of the equation 2C6H6 (l) + 15O2 → 12CO2 (g) + 6H2O (g)? Given: ΔHfo C6H6 = 49.00 kJ/mol, ΔHfo CO2 = –394 kJ/mol, ΔHfo H2O = –242 kJ/mol.

A. ΔHo = –6,082 kJ

B. ΔHo = –6,278 kJ

C. ΔHfo = –6,082 kJ

D. ΔHfo = –6,278 kJ

E. ΔHfo = 6,278 kJ

Solution:

$$\Delta H_0 = \sum\left(\Delta H^0_{f\ products}\right) - \sum\left(\Delta H^0_{f\ reactants}\right)$$

$$\Delta H_0 = \left(12 * \Delta H^0_f(CO_2) + 6 * \Delta H^0_f(H_2O)\right) - \left(2 * \Delta H^0_f(C_6H_6) + 15 * \Delta H^0_f(O_2)\right)$$

$$\Delta H_0 = \left(12 * (-394) + 6 * (-242)\right) - (2 * 49 + 15 * 0) = -6.278\ kJ/mol$$

P.S. We've calculated nonstandard enthalpy of reaction, because H20 isn't in standard state.

Answer: B