Question:

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.

Solution:

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

$$\Delta H^0 = 12\Delta H^0_f(CO2) + 6\Delta H^0_f(H2O) - 2\Delta H^0_f(C6H6) - 15\Delta H^0_f(O2)$$

$$\Delta H^0 = (-394 * 12 - 242 * 6) - (2 * 49 - 15 * 0) = -4728 - 1452 - 98 = -6278\ kJ/mol$$

H20 is not in standard state, that's why we've calculated nonstandard enthalpy of reaction.

Answer: B. ΔH_0 = – 6,278 kJ/mol