Answer on Question #55535 - Chemistry - General chemistry

Answer:

1. The required heat is determined by the equation:

$Q = mC\Delta t$, where m - the mass of lead, C - the specific heat capacity, Δt - the temperature change (Δt = 37 ^oC - 22 ^oC = 15 ^oC).

Thus,

$Q = 35\ g \times 0.13\ J\ g^{-1}\ K^{-1} \times 15\ ^oC =$ **68.25 J**

2. The standard enthalpy change of formation of the reagents and the products are:

$Ca(OH)_2$ (aq), $\Delta H_f = -1002.82\ kJ\ mol^{-1}$

H_3AsO_4 (aq), $\Delta H_f = -898.6\ kJ\ mol^{-1}$

$[H_2AsO_4]^-$, $\Delta H_f = -913.2\ kJ\ mol^{-1}$

$[Ca]^{2+}$, $\Delta H_f = +1925.90\ kJ\ mol^{-1}$

H_2O, $\Delta H_f = -286\ kJ\ mol^{-1}$

According to Hess's law the enthalpy change for the reaction is:

$\Delta H = 2\ \Delta H_f(H_2O) + \Delta H_f(Ca^{2+}) + 2\ \Delta H_f([H_2AsO_4]^-) - \Delta H_f(Ca(OH)_2) - 2\Delta H_f(H_3AsO_4)$

$\Delta H = -572\ kJ\ mol^{-1} + 1925.90\ kJ\ mol^{-1} - 1826.4\ kJ\ mol^{-1} + 1002.82\ kJ\ mol^{-1} + 1797.2\ kJ\ mol^{-1} =$

$=$ **+2327.52 kJ mol^{-1}**

3.

True/False questions:
G) The enthalpy change of a reaction is the reciprocal of the ΔH of the reverse reaction.
_true__
Hf , the standard enthalpy of formation of a compound, is the change in enthalpy for theΔH) reaction that forms one mole of the compound from elements with all substances in their standard state._ true_
I) The enthalpy of a reaction is equal to the heat of the reaction. ____false___
J) When work is done on a system, w will be a negative value. ___false___
K) Bomb calorimeter measures q which is ΔH. ___true_____
L) Standard state of a substance is its pure form at atmospheric pressure (1 atm) and the temperature of 0 °C._____false_____