Chemistry 141 Name

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Quiz 6A (20 points) March 11, 2010

All work must be shown to receive credit.

Specific heat of water = 4.184 J/goC

1. (10 points) Benzoic acid, C7H6O2, occurs naturally in many berries. Suppose you burn 1.50 g of the compound in a combustion calorimeter and find that the temperature of the calorimeter increases from 22.50oC to 31.69oC. The calorimeter contains 775 g or water for this experiment and the bomb calorimeter has a heat capacity of 893 J/oC. How much heat is evolved per mol of benzoic acid?

Would the H be a positive or a negative value?

Heat lost benzoic acid reacting = heat gained by calorimeter + heat gained by water

The ∆H is negative!

1. (6 points) Using Hess law, calculate the enthalpy change for the reaction of lead(II) chloride with chlorine to give lead(IV) chloride.

PbCl2(s) + Cl2(g) 🡪 PbCl4(s) H = ?

The known reactions are listed below

Pb(s) + Cl2(g) 🡪 PbCl2(s) ΔH = − 359.4 kJ

Pb(s) + 2 Cl2(g) 🡪 PbCl4(s) ΔH = − 329.5 kJ

 PbCl2(s) 🡪 Pb(s) + Cl2(g) ΔH = + 359.4 kJ

Pb(s) + 2 Cl2(g) 🡪 PbCl4(s) ΔH = − 329.5 kJ

PbCl2(s) + Cl2(g) 🡪 PbCl4(s) H = (359.4 - 329.5) kJ = 29.9 kJ

1. (4 points) The standard heat of formation for ethyl alcohol, CH3CH2OH is – 277.69 kJ/mol. Write the equation that has this energy.

2 C(s) + 3 H2(g) + ½ O2(g) 🡪 CH3CH2OH Hfo = - 277.69 kJ/mol