**Name: Period: Seat#:**

**Worksheet #10**

**Directions:** Show all work in a way that would earn you credit on the AP Test! This is always the rule! Some answers are provided at the end in italics and underlined. If you need more space, use binder paper and staple to your worksheet.



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| --- |
| 1. Considering bonds broken and formed ONLY, what is the enthalpy change for the following reaction:

**C40H82 🡪 C16H34 + 2C12H24** |
| 1. The rxn **BBr3(g) + BCl3(g) 🡪 BBr2Cl(g) + BCl2Br(g)** has a ΔH very close to zero. Explain why ΔH is so small.
 |
| 1. Determine the enthalpy of reaction for the following using bond energies.

**H2(g) + ½ O2(g) 🡪 H2O(g) ΔH = −246 kJ** |
| 1. Ammonia reacts with oxygen to form nitrogen dioxide and steam, as follows. Use data for bond energies to determine the bond energy of the N−O bond of NO2

**4NH3(g) + 7O2(g) 🡪 4NO2(g) + 6H2O(g)** |
| 1. Determine the enthalpy of the following reaction using bond energies:

CH3CH=CH2 + 4.5O=O **🡪** 3O=C=O + 3H−O−H |
| 1. Determine the enthalpy for the following reaction: **C(s) + CO2(g) 🡪 2CO(g)**

The enthalpy of sublimation of graphite, C(s) is 719 kJ/mol |
| 1. Calculate the bond dissociation energy for one mole of O−F bonds, given the following data. (Hint: oxygen is the central atom of OF2)

**F2(g) + ½ O2(g) 🡪 OF2 (g) ΔH = 28 kJ** |
| 1. Using bond enthalpy (in kJ mol-1) values, determine the heat of formation of methane:

Sublimation energy of C (s, gr) = 719 kJ/mol |
| 1. An unknown gas, X2, which behaves much like nitrogen gas (N≡N), is analyzed and the following enthalpies of formation are obtained. The X−H bond energy is known to be 383 kJ/mol. Use this information to estimate the X−X single-bond energy in the X2H4 molecule.

X(g) = 412 kJ/molH(g) = 217 kJ/molX2H4(g) = 3 kJ/mol |
| 1. Calculate enthalpy of this reaction using bond energies and and the following enthalpy of formation

 **C(s) + 2H2(g) 🡪 CH4(g)** C(g) = +715 kJ/mol:  |