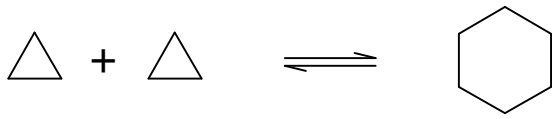
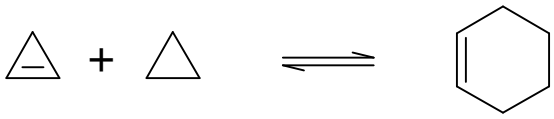
Chem 201, 2009
HW #5, due Th, Nov 5, 12 PM

We will be starting chapter 8 next week so this problem set includes some material from the first half of that chapter.

1. A. Using the heat of formation data in your book, estimate ΔH_{rxn} for the following reaction:



B. Bond energies suggest this reaction should be thermoneutral, so how do you account for your answer in part A?
C. Bond energies suggest the following reaction should also be thermoneutral, but $\Delta H_{rxn} \approx -334$ kJ/mol. How do you account for this? (Make sure you compare this value to the one from part A as part of your answer.)



2. To explain the following phenomena, you need to invoke the interatomic forces discussed in chapter 8.3.
A. The diaxial conformation of *cis*-1,3-cyclohexanediol is more stable than the diequatorial conformation. Why? Provide a drawing that supports your answer.
B. The diaxial conformation of *trans*-1,2-dibromocyclohexane is more stable than the diequatorial conformation. Why? Again, a drawing might be useful.

3. An optically active mixture of *trans*- and *cis*-3,6-dimethylcyclohexene is treated with Br_2 in CCl_4.
A. Which cyclohexene is responsible for the optical activity? Arbitrarily choose one enantiomer of this cyclohexene for part B.
B. Draw all of the product(s) that will be obtained from each cyclohexene (no conformations needed, just planar structures with stereochemical symbols).
C. Will the product mixture be optically active? Explain.

4. The preferred geometry of 12-crown-4 is shown below from two points-of-view along with a space-filling model (size is reduced 25% to make it fit on page). The OCCO dihedral angles are 83° if you would like to build a plastic model. What notable feature of the usual drawing of 12-crown-4 (Loudon, p. 351) actually is missing in the model?