CHAPTER OUTLINES/WORKSHEETS

CHAPTER 10

ALKYL HALIDES

I. NOMENCLATURE

   1. Parent hydrocarbon chain (number starting at end nearest the first substituent)
   2. di-, tri-, tetra-…for multiple halides
   3. Alphabetical ordering
   4. Names of simple halides

II. STRUCTURE

   1. Bond lengths (C-F:1.39/C-C:1.5/C-Cl:1.78/C-Br:1.93/C-I:2.14)
   2. Dipole moments and polarity

III. SYNTHESIS OF ALKYL HALIDES

   1. Radical halogenation
      a. Mechanism (initiation, propagation, termination)
      b. Regioselectivity (radical stability)
   2. Allylic bromination of alkenes
      a. Resonance stabilization of a radical
      b. Representations of resonance forms
      c. Five rules of resonance

         Imaginary
         Differ only in placement of pi or nonbonding electrons
         Different resonance forms do not have to be equivalent
         Resonance forms must obey rules of valence
Resonance hybrids more stable than any single resonance form

3. From alcohols (rate of reaction)

IV. REACTIONS OF ALKYL HALIDES

1. Grignard reagents (magnesium, carbanions, bond polarity, limitations)
2. Gilman reagents (lithium, carbanions, organocopper reagents)
   a. Coupling reactions

Chapter 10 Worksheet

Where are halogenated compounds found in nature?

What classes of organic halides exist?

How are alkyl halides named?

What is the polarity of the carbon-halogen bond?

Are alkyl halides electrophiles?

How can alkyl halides be prepared? What two radical reactions are useful in this context?

Why are tertiary hydrogen atoms removed more readily than primary hydrogen atoms?

What is the major product of the radical reaction of chlorine with butane? Why?

Why is the allylic radical particularly stable as compared to primary and secondary radicals?

What are the resonance structures? What is a resonance hybrid?

What is most important postulate of resonance theory?

How can resonance effect the regiochemistry of a reaction?

How can allyl halides be prepared from alcohols (several methods)?

How are Grignard reagents prepared? What is the polarization of the carbon-magnesium bond? Why?

Are Grignard reagents electrophiles or nucleophiles?

What is an organometallic coupling reaction? Why types of reactants are involved?