UNIT 8 – ALKYL HALIDES

VTOC: Alkyl Halides Occurrence
General Reactivity
Substitution(of X)
S_N2 Mechanism
S_N1 Mechanism
Elimination (of HX)
Summary of Substitution vs. Elimination
Substitution by Metals
Elimination Reactions of Dihalides

UCD: Section 8.1: Introduction to the nucleophilic substitution reaction
Section 8.2: Two mechanistic models for a nucleophilic substitution reaction
Section 8.3: More about nucleophiles
Section 8.4: Electrophiles and carbocation stability
Section 8.5: Leaving groups and solvent effects

Skills:

8A. Identify halides and carbocations as being 1°, 2°, or 3°
8B. Draw the mechanism of an S_N2 and S_N1 reactions including stereochemistry
8C. Predict how reaction conditions (substrate, nucleophile, leaving group, solvent) effect the rate of S_N1 and S_N2 reactions.
8D. Determine if a set of conditions is likely to be S_N1 or S_N2 and predict the products including stereochemistry.
8E. Identify alkenes as being mono, di, tri or tetra substituted, cis or trans, and predict the trend in stability
8F. Draw the mechanism of the E2 & E1 reactions.
8G. Predict all possible elimination products of an alkyl halide and identify the major product
8H. Predict how reaction conditions (substrate, base, leaving group, solvent) effect the rate of E2
8I. Predict the products of Substitution and Elimination reactions
8J. Determine if a set of conditions will be S_N2, E2 or S_N1/E1 and predict the products.
8K. Predict the elimination products of dihalides

Nu	Base	Examples	Methyl	1°	2°	3°	Remarks
Neutral	Weak	H_2O, ROH	n/a	n/a	S_N1/E1	S_N1/E1	Always S_N1/E1 mix
Negative	Weak	Cl-, Br-, I-, SH-, CN-, RCO_2-	S_N2	S_N2	S_N2	S_N1/E1	S_N2, except with 3°
Good	Strong	-OH, -OR -C≡CR, $-NH_2$	S_N2	S_N2	S_N2/E2	E2	
Poor	Strong & Bulky	-O*t*Bu, DBN, DBU	S_N2	E2	E2	E2	E2, except with methyl
Remarks			Always S_N2	Always S_N2, except with bulky base			