

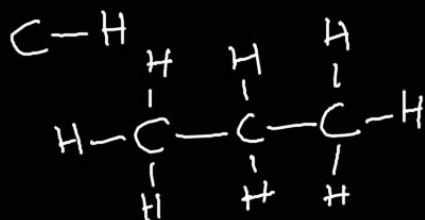
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Organic Chemistry

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Abbreviated Line Structures: Line Angle Structures

Abbreviated Line Structures



- 1) Carbons are vertices
- 2) C-H bonds are not drawn
- 3) H bonds to atoms other than C are drawn

Basic Organic Chemistry Nomenclature

Number	Prefix	Alkanes	Name	
1	meth-	$\begin{array}{c} \text{H} \\ \\ \text{H}-\text{C}-\text{H} \end{array}$	methane	
2	eth-	$\begin{array}{c} \text{H} \\ \\ \text{H}_3\text{C}-\text{CH}_3 \end{array}$	ethane	
3	prop-		Propane	Cyclohexane
4	but-		butane	
5	pent-		Pentane	
6	hex-		hexane	Cyclopropane
7	hept-		heptane	
8	oct-		octane	
9	non-		nonane	
10	dec-		decane	Cyclopentane

Substituents - add -yl

$\text{R}-\text{CH}_3$ methyl

CH_2CH_3 ethyl

$\text{CH}_2\text{CH}_2\text{CH}_3$ propyl

butyl

isopropyl

isobutyl

Sec-butyl

tert-butyl
t-butyl

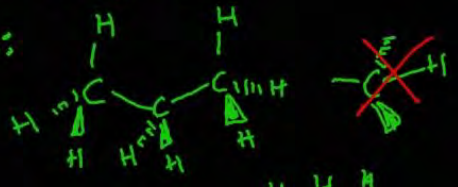
Different Ways to Draw Organic Molecules

Line Angle: 

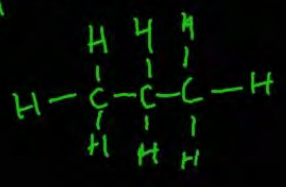
Sawhorse: 

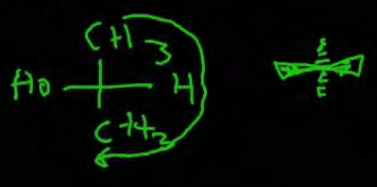
Condensed: $\text{CH}_3\text{CH}_2\text{CH}_3$

Newman Projections: 

Wedge-dash: 

Fisher: 

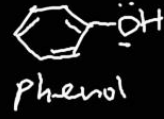
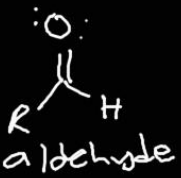
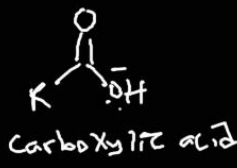
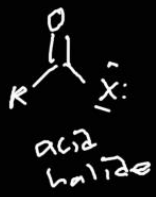
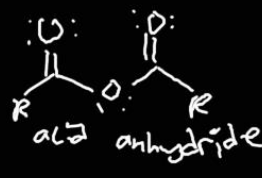
Lewis structure: 



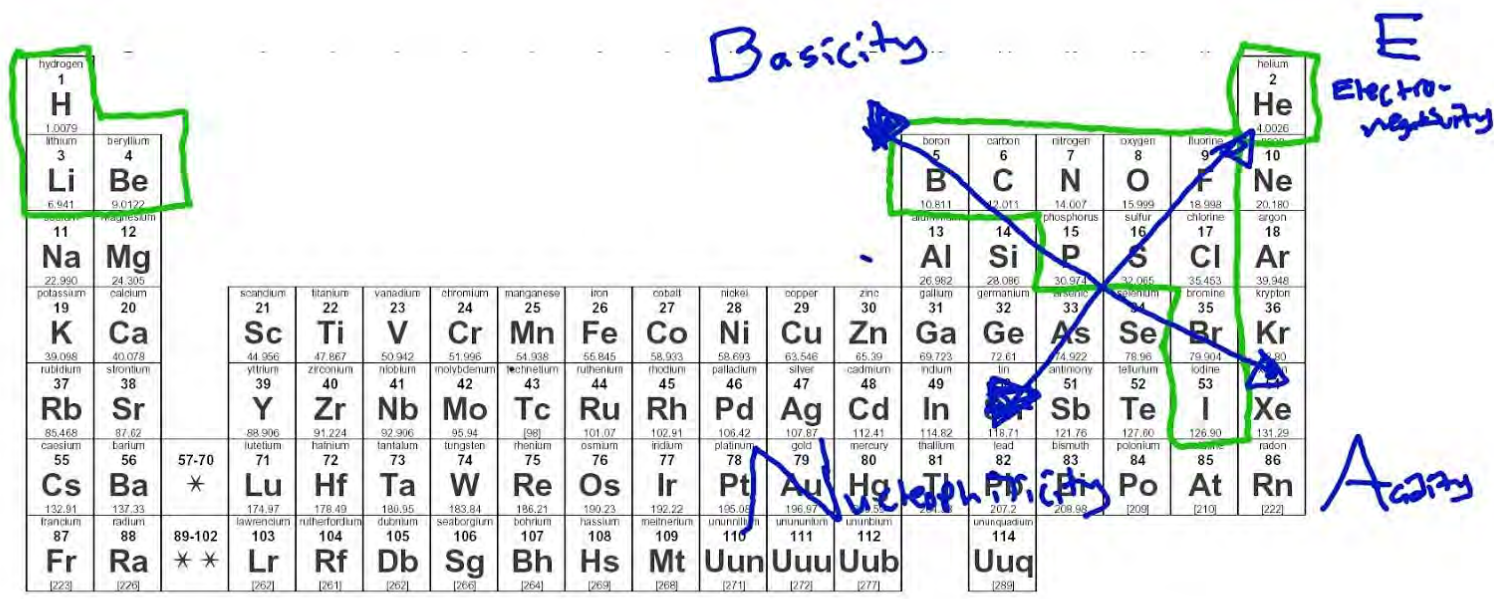
Common Functional Groups

Common Functional Groups

R = rest of the molecule X = halogen (F, Cl, Br, I)

$R-CR$ alkane	$R=CR$ alkene (olefin)	$R\equiv CR$ alkynes	$R-X$ halide	$R-\ddot{O}H$ alcohol
$R-\ddot{S}H$ thiol	$R-O-R$ ether	 epoxide oxirane	 phenol	 aldehyde
 ketone	 amine	 carboxylic acid	 acid halide	 anhydride
 ester	 amide			

Organic Chemistry Periodic Table Trick: BEAN, Basicity, Electrophilicity, Acidity, Nucleophilicity



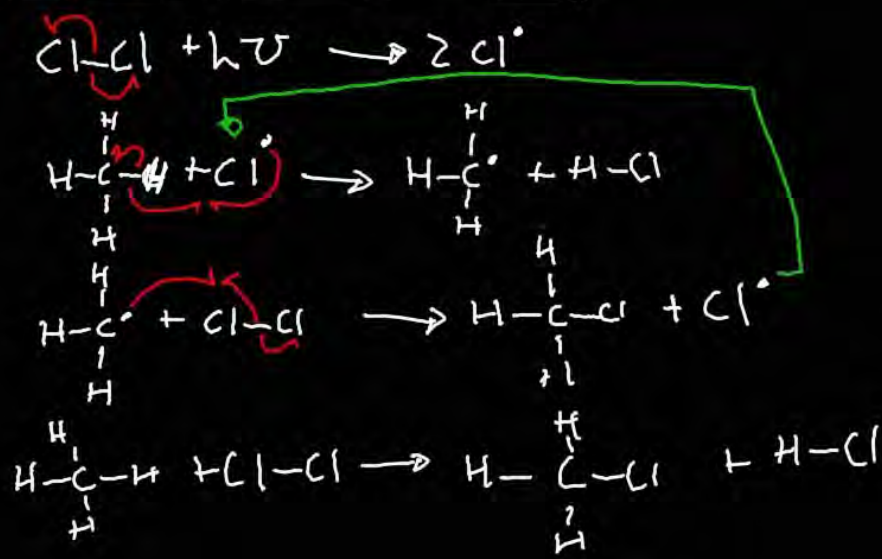
* Lanthanide series

** Actinide series

lanthanum	cerium	praseodymium	neodymium	promethium	samarium	europium	gadolinium	terbium	dysprosium	holmium	erbium	thulium	ytterbium
57	58	59	60	61	62	63	64	65	66	67	68	69	70
La	Ce	Pr	Nd	Pm	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb
139.91	140.12	140.91	144.24	[145]	150.36	151.96	157.25	158.93	162.50	164.93	167.26	168.93	173.04
actinium	thorium	protactinium	uranium	neptunium	plutonium	americium	curium	berkelium	californium	einsteinium	fermium	mendelevium	nobelium
89	90	91	92	93	94	95	96	97	98	99	100	101	102
Ac	Th	Pa	U	Np	Pu	Am	Cm	Bk	Cf	Es	Fm	Md	No
[227]	232.04	231.04	238.03	[237]	[244]	[243]	[247]	[247]	[251]	[252]	[257]	[258]	[259]

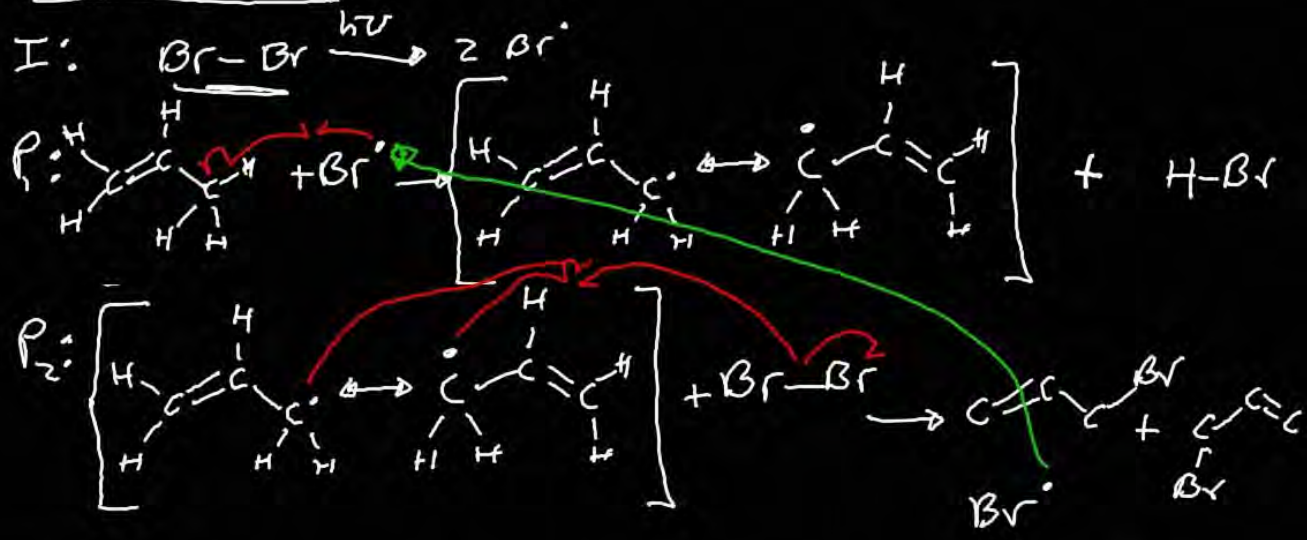
Free Radical Halogenation Mechanism

Free Radical Halogenation



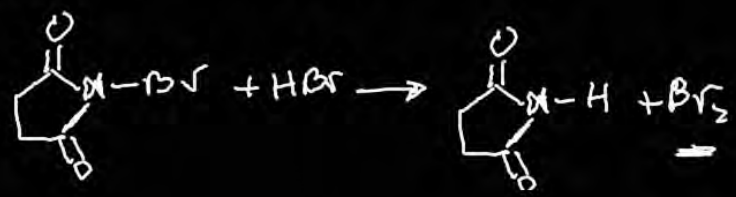
Allylic Bromination Mechanism

Allylic Bromination



NBS (N-bromosuccinimide)

Allylic shift



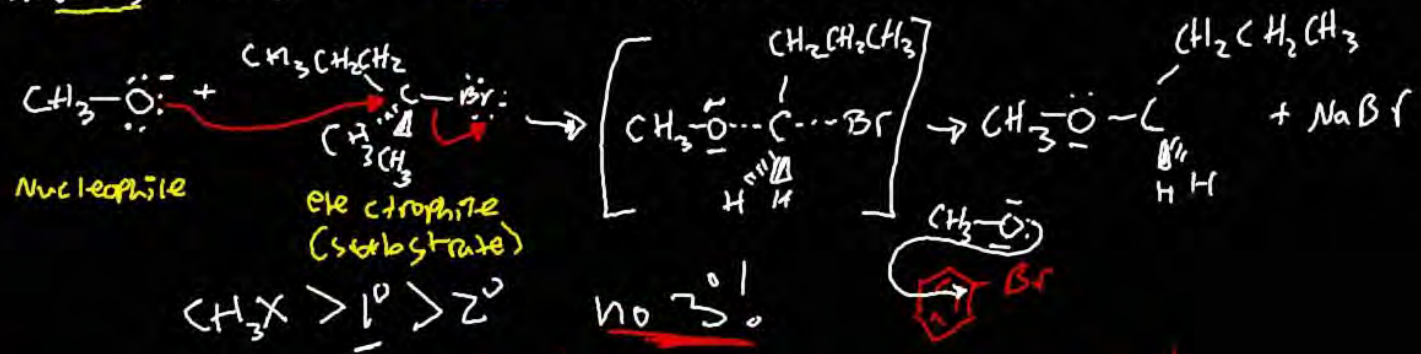
The SN2 Reaction

The SN2 Reaction

The SN2 reaction takes place in a single (concerted) step. A strong nucleophile attacks the electrophilic carbon, forcing the leaving group to leave. (Substitution, Nucleophilic, Bimolecular)

$$\text{Rate} = [\text{R-X}][\text{Nuc}^-]$$

Example



No SN2 on 3°! No SN2 on sp^2 !

The SN1 Reaction

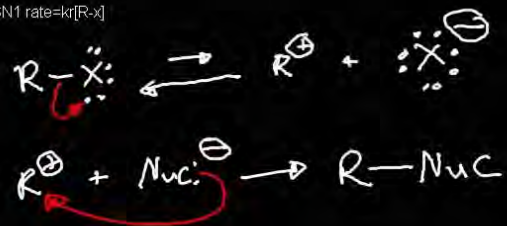
The S_N1 Reaction

(Substitution, nucleophilic, unimolecular)

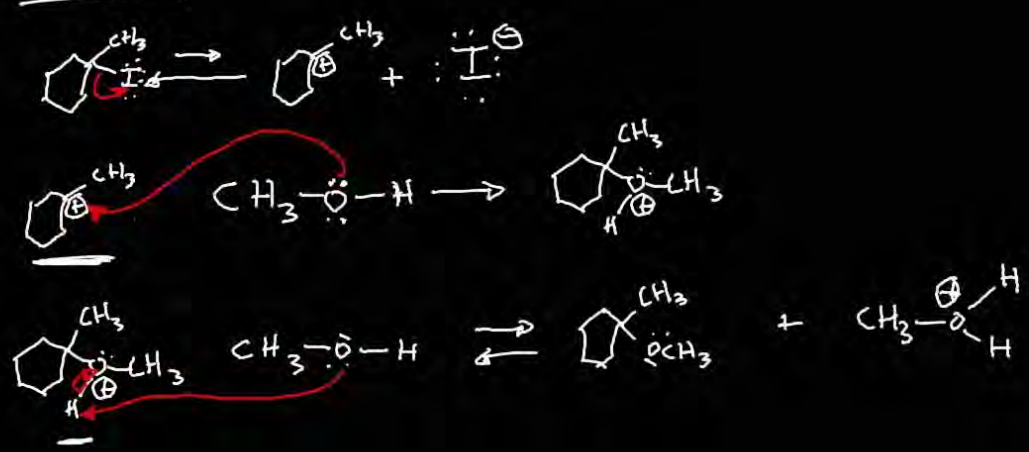
A two step mechanism. A slow ionization gives a carbocation that reacts quickly with a (usually weak) nucleophile.

Reactivity: 3° > 2° > 1°

SN1 rate = k[R-X]



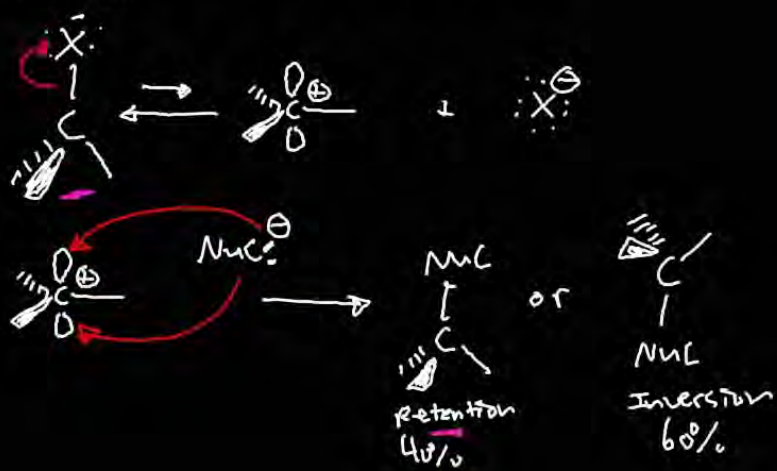
Example



Racemization in the SN1 Reaction

Racemization in the SN1 Reaction

The SN1 reactions carbocation intermediate is flat, which can be attacked from either side.

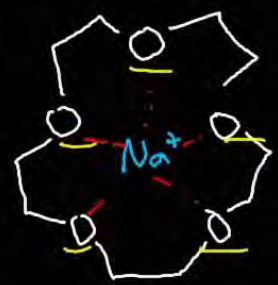


Crown Ether Nomenclature

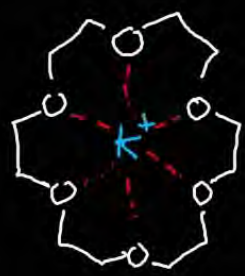
Crown Ethers



12-crown-4



15-crown-5



18-crown-6

Reading an IR Spec Simplified

