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## Some keywords

alkane halogenation (chlorination and bromination)

addition of HX, bromination, hydroboration, ozonolysis, dihydroxylation (OsO<sub>4</sub>) epoxidation (m-CPBA)....

Lindlar, Na/NH<sub>3</sub>, acetylide addition, synthesis of alkynes via elimination,

S<sub>N</sub>1, S<sub>N</sub>2, E1, E2, plus rearrangements (hydride and alkyl shifts)

oxidation to give aldehydes and ketones, alkyl halide formation (SOCl<sub>2</sub>, PBr<sub>3</sub>), Williamson ether synthesis, elimination....

Alkyl halides from alcohols, elimination, ether formation, ether cleavage...

opening epoxides with Grignards and other nucleophiles, opening epoxides under acidic conditions....

formation of organolithium and Grignard reagents, reactions with aldehydes, ketones, esters, acids, CO<sub>2</sub>....

electrophilic aromatic substitution, side chain modification, nucleophilic aromatic substitution....

Addition reactions to aldehydes and ketones, Wittig reaction, reduction of aldehydes and ketones

synthesis of carboxylic acids, Fischer esterification, ester hydrolysis, addition of Grignards, reduction with LiAlH<sub>4</sub>, partial reduction...

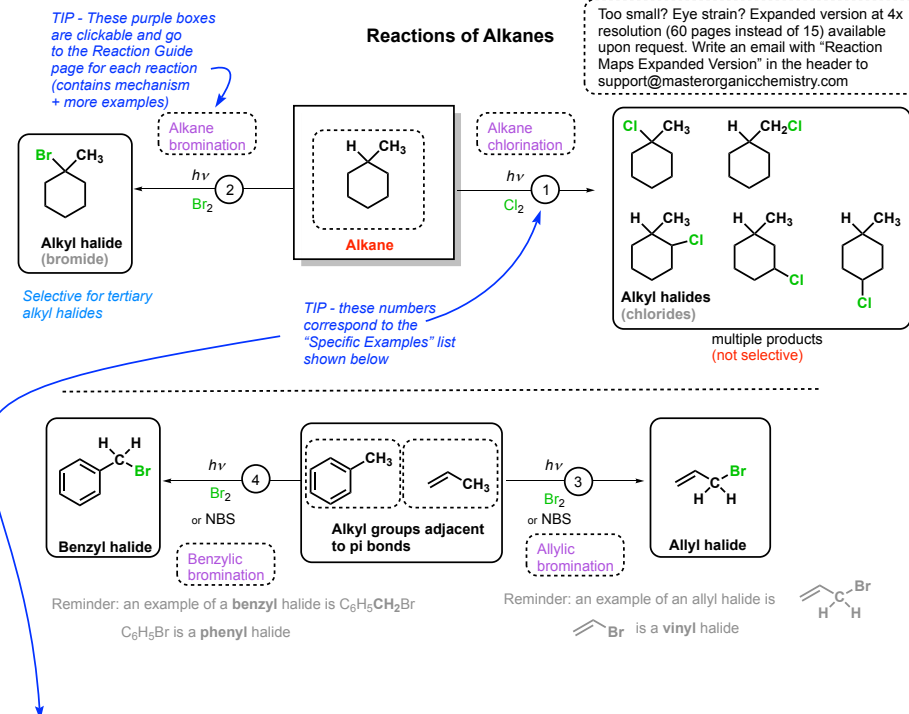
acid halides from acids with SOCl<sub>2</sub>, hydrolysis, Friedel-Crafts acylation, reduction, Grignard addition....

keto-enol tautomerism, decarboxylation, aldol reaction, enamines, enolate formation, Michael reaction, Robinson annulation....

synthesis of nitriles, reduction of nitriles, reductive amination, imine formation, synthesis of amines....

Rearrangements: Cope, Claisen, pinacol, Curtius, Wolff, Strecker synthesis, Cannizzaro, diazonium salts....

## Reactions of Alkanes



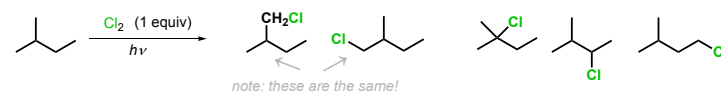
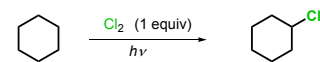
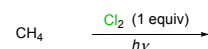
Too small? Eye strain? Expanded version at 4x resolution (60 pages instead of 15) available upon request. Write an email with "Reaction Maps Expanded Version" in the header to support@masterorganicchemistry.com

## Some Abbreviations

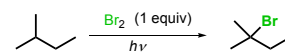
Me	Methyl, -CH <sub>3</sub>	i-Pr	isopropyl		Bn	Benzyl	
Et	Ethyl, -CH <sub>2</sub> CH <sub>3</sub>				Ph	Phenyl	
Pr	Propyl, -CH <sub>2</sub> CH <sub>2</sub> CH <sub>3</sub>	t-Bu	tert-butyl				
Bu	Butyl, -CH <sub>2</sub> CH <sub>2</sub> CH <sub>2</sub> CH <sub>3</sub>						
hν	light (UV or visible radiation)	Ac	acetyl		1°	primary (carbon, alcohol, amine, alkyl halide)	
Δ	heat				2°	secondary (carbon, alcohol, amine, alkyl halide)	
Ts	Tosyl p-toluenesulfonyl				3°	tertiary (carbon, alcohol, amine, alkyl halide)	
					4°	quaternary (carbon, ammonium salt)	
Ms	Mesyl methanesulfonyl				LDA	Lithium di-isopropyl amide	
					strong, bulky base		
DCC	N,N'-Dicyclohexyl carbodiimide				m-CPBA	meta-chloroperoxybenzoic acid	
	useful for making amides					makes epoxides from alkenes, also esters from ketones	
DIBAL	Di-isobutyl aluminum hydride				NBS	N-bromosuccinimide	
	bulky reducing agent					allylic bromination, bromination of alkenes	
DMP	Dess-Martin Periodinane				PCC	Pyridinium chlorochromate	
	oxidizes alcohols					oxidizes alcohols	
LiAlH(OiBu) <sub>3</sub>	Lithium tri(t-butoxy) aluminum hydride				TBAF	Tetrabutylammonium fluoride	
	reduces acid halides to aldehydes					fluoride source for removing silicon protecting groups	

## Specific examples

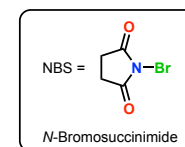
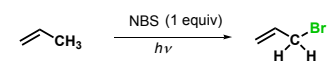
### 1 Chlorination of alkanes



### 2 Bromination of alkanes



### 3 Allylic bromination



### 4 Benzylic bromination

