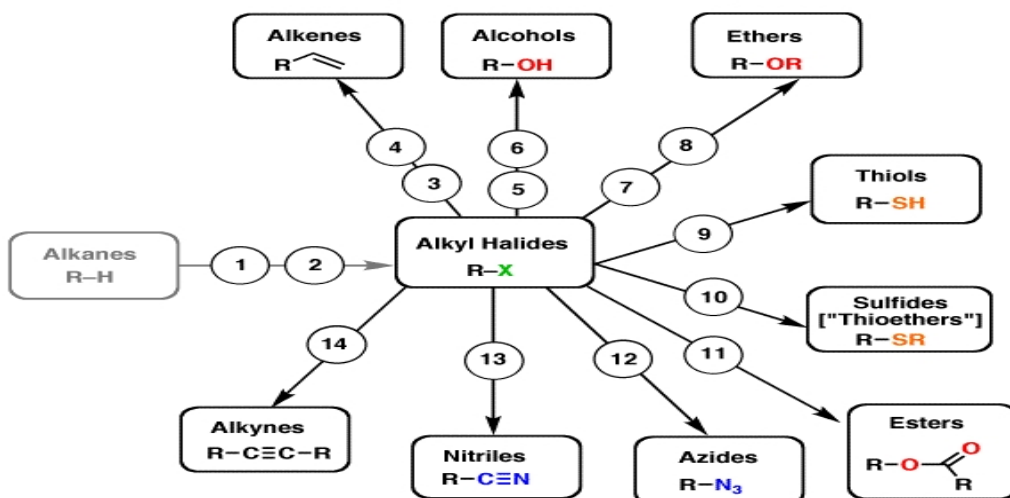


Reaction Map: Reactions of Alkanes & Alkyl Halides



Reaction	Name	Typical Conditions	Notes [1°, 2° and 3° refers to primary, secondary, tertiary]
1	Free radical chlorination	Cl <sub>2</sub> , hν	Not highly selective
2	Free radical bromination	Br <sub>2</sub> , hν	Highly selective for tertiary C-H
3	Elimination [E2]	RO <sup>⊖</sup> /ROH	Best for 2° and 3°, <i>anti</i> stereochemistry
4	Elimination [E1]	polar solvent, heat	Competes with S <sub>N</sub> 1
5	Alcohol Formation [S <sub>N</sub> 2]	OH <sup>⊖</sup> / H <sub>2</sub> O	Best for 1° alkyl halides; 2° can compete w/ E2
6	Alcohol Formation [S <sub>N</sub> 1] "Solvolysis"	H <sub>2</sub> O	Best for 3° alkyl halides; rearr possible w/ 2°
7	Ether Formation [S <sub>N</sub> 2] ["Williamson Ether Synthesis"]	RO <sup>⊖</sup> /ROH	Best for 1° alkyl halides; 2° can compete w/ E2
8	Ether Formation [S <sub>N</sub> 1] "Solvolysis"	ROH	Best for 3° alkyl halides; rearr possible w/ 2°
9	Thiol formation [S <sub>N</sub> 2]	SH <sup>⊖</sup>	S <sub>N</sub> 2; best for 1° alkyl halides, 2° OK
10	Sulfide formation [S <sub>N</sub> 2]	SR <sup>⊖</sup>	S <sub>N</sub> 2; best for 1° alkyl halides, 2° OK
11	Ester formation [S <sub>N</sub> 2]	RCO <sub>2</sub> <sup>⊖</sup>	S <sub>N</sub> 2; best for 1° alkyl halides, 2° OK
12	Azide formation [S <sub>N</sub> 2]	N <sub>3</sub> <sup>⊖</sup>	S <sub>N</sub> 2; best for 1° alkyl halides, 2° OK
13	Nitrile formation [S <sub>N</sub> 2]	CN <sup>⊖</sup>	S <sub>N</sub> 2; best for 1° alkyl halides, 2° OK
14	Alkyne formation [S <sub>N</sub> 2]	R-C≡C <sup>⊖</sup>	Best for 1° alkyl halides; 2° can compete w/ E2

in polar aprotic solvent