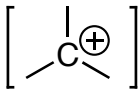
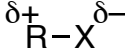
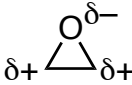
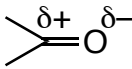
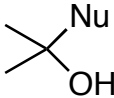
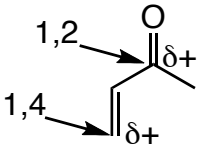
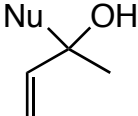
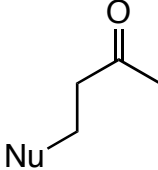
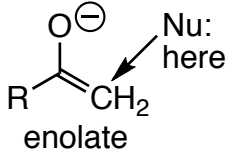
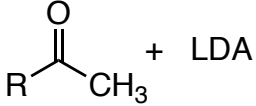
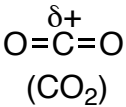
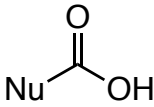
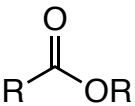
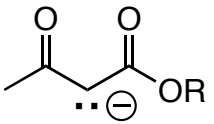
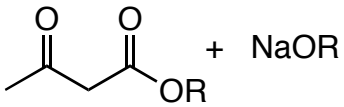
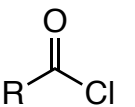
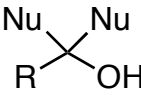


CHM 422 Organic Synthesis, Dr. Laurie S. Starkey

Electrophiles and Nucleophiles

Most organic reactions result from the union of an electron-rich Nucleophile (Nu:) with an electron-poor Electrophile (E⁺). Shown below are several Nu: and E⁺ that are commonly utilized in organic synthesis.

Nucleophiles (Nu:)	Reagents/notes	Electrophiles (E ⁺)	Notes
RO [⊖]	ROH + NaH		Can't put this in a bottle! Instead, our E ⁺ reagents will have δ ⁺ sites.
RNH ₂	(RNH [⊖] is a strong base, not a Nu:)		R-Cl, R-Br, R-I (Br-Br)
NO ₂ [⊖] , N ₃ [⊖]	NaNO ₂ , NaN ₃ → amine synthesis		Nu-CH ₂ -CH ₂ -OH
I [⊖]	NaI (best halide Nu:)		
H [⊖]	LiAlH ₄ or NaBH ₄	(ketone/aldehyde)	
R [⊖]	$RX + Mg \rightarrow RMgX$ $RX + Li \rightarrow RLi$ $2 RLi + Cu \rightarrow R_2CuLi$		1,2-add'n Nu: = LiAlH ₄ , RMgX, RLi  1,4-add'n (Michael) Nu: = enolate, cuprate, N, O 
N≡C [⊖]	NaCN		
RC≡C [⊖]	RC≡CH + NaNH ₂		
			
NO ₂ -CH ₂ [⊖]	"EWG"-CH ₃ + LDA (enolate-like Nu:'s)		carboxylic acid derivatives generally add 2 eq. of C or H Nu: (addn/elim mech)
NC-CH ₂ [⊖]			
			

Note: The enolate of acetoacetate is often used as a *synthetic equivalent* of the acetone enolate, since acetone itself typically gives poor yields. The extra C is lost by hydrolysis/decarboxylation.

