SOME REDUCING AGENTS IN ORGANIC CHEMISTRY

	alkene	alkyne	aromatic ring	alkyl halide	alcohol	epoxide	aldehyde	ketone	acid chloride	carbox. acid	ester	amide	nitrile	nitro, nitroso
H_2/Pt or H_2/Pd	+	+	high P		OH	+	+	+	+	–	+	+	+	+
H_2/Pt/$BaSO_4$		+					–	–	+					
$LiAlH_4$	–	CH		+	OH	+	+	+	+	+	+	+	+	+
$LiAl(OtBu)_3H$	–	–				–	slow	slow	+	–	+	–	–	–
$NaBH_4$	–	–		+	–	+	+	+	+	OH	–	some	–	–
B_2H_6, BH_3	+	+				+	+	+	–	+	+	+	+	–
Na or Li		CH												
Na, NH_3		+	+			+								
Sn,Zn,orFe,HCl		+		+	+		+							+
Zn(Hg),HCl							+	+						
Mg				+										
RMgX		CH		+	OH	+	+	+	+	OH	+	?	+	?
RLi, RNa		CH		+	OH		+	+		OH				
R_2CuLi, R_2Cd				+			slow	slow	+					
$O=C-C^-$				+	OH	+	+	+		OH	+	?		
$RC\equiv C^-$				+	OH	+	αCH	αCH	αCH	OH				
$\phi_3P=CHR$					OH		+	+		OH				
NH_2NH_2, OH^-							+	+	hydrol	OH				
	alkene	alkyne	aromatic ring	alkyl halide	alcohol	epoxide	aldehyde	ketone	acid chloride	carbox. acid	ester	amide	nitrile	NO_2 NO

+ reduction of functional group – no reaction CH, OH acid-base reaction ? expect reaction but no evidence found

Alkenes conjugated with carbonyls may be reduced by hydride and organometallic reagents, unlike nonpolar alkenes; C=O/C=C selectivity is always sensitive to stereochemistry

A blank space means that information was not readily available or provided examples of both + and –; contributions welcome. **L. M. SWEETING 1995**