EngineeringRise

Alkenes and alkynes: reactions and mechanisms

Formulas and units, JEE Main. Status: Reviewed on 2026-11-20.

Result	Formula	Units or note
General formulas	alkene CnH2n; alkyne CnH2n-2 Valid when: acyclic hydrocarbons with one C=C (alkene) or one triple bond (alkyne)	dimensionless (counts)
Degree of unsaturation	(2C + 2 - H) / 2 (a halogen counts like H; each N adds 1 to the numerator) Valid when: neutral molecule of known formula; counts rings plus pi bonds	dimensionless
Markovnikov rule	H adds to the carbon with more H; X to the carbon with fewer H Valid when: ionic addition of HX to an unsymmetrical alkene, no peroxide	n/a (rule)
Carbocation stability	3 degree > 2 degree > 1 degree > CH3 cation Valid when: alkyl carbocations; stabilised by alkyl groups (+I, hyperconjugation)	n/a (order)
Hydrogen halide reactivity	HI > HBr > HCl; peroxide effect only for HBr Valid when: electrophilic addition of HX; radical peroxide route only for HBr	n/a (order)
Acidity and s-character	sp (50 percent) > sp2 (33 percent) > sp3 (25 percent) Valid when: comparing C-H acidity in hydrocarbons	percent s
Alkyne hydration	R-C(triple bond)-H + H2O (Hg2+, H+) gives R-CO-CH3; ethyne gives CH3CHO Valid when: Hg2+/H+ hydration; terminal alkynes give methyl ketones	n/a (rule)
Hydrogen needed for saturation	moles of H2 = moles of C=C + 2 x moles of C-triple-bond-C Valid when: complete hydrogenation of non-aromatic C=C and triple bonds	mol
Addition polymer	units n = polymer molar mass / monomer molar mass Valid when: addition polymer; average chain, monomer mass equals repeat-unit mass	dimensionless
Ozonolysis (reductive)	C=C gives two C=O; =CH2 gives HCHO, =CHR gives RCHO, =CR2 gives R2CO Valid when: reductive work-up (Zn/H2O or Me2S)	n/a (rule)

Full lesson with worked examples:
https://www.engineeringrise.in/learn/learn/jee-main/chemistry/hydrocarbons/alkenes-and-alkynes-reactions-and-mechanisms

EngineeringRise is an unofficial study site. It is not affiliated with NTA, the IITs, BITS, VIT, SRM or any exam body.