Haloalkanes and haloarenes: preparation, properties and the C-X bond

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

Result	Formula	Units or note
CH3-X bond enthalpy	F 452 > Cl 351 > Br 293 > I 234	kJ per mol
Rate order in substitution	RI > RBr > RCl > RF Valid when: comparing alkyl halides with the same alkyl group	dimensionless (relative rate)
Alcohol to chloride (clean)	ROH + SOCl2 gives RCl + SO2 + HCl Valid when: primary and secondary alcohols; gaseous SO2 and HCl by-products	mol ratio 1 : 1
Finkelstein exchange	RCl + NaI (dry acetone) gives RI + NaCl (ppt) Valid when: dry acetone with NaI; NaCl precipitates	mol ratio 1 : 1
Swarts fluorination	2RBr + Hg2F2 gives 2RF + Hg2Br2 (also AgF, SbF3) Valid when: alkyl chloride or bromide with metal fluoride (Hg2F2, AgF, SbF3)	mol ratio as balanced
Ambident nucleophiles	KCN: RCN; AgCN: RNC; KNO2: R-ONO; AgNO2: R-NO2 Valid when: ambident nucleophile; ionic salts attack via C or O, silver salts via N	product type
Vector sum of two equal moments	mu(res) = 2 mu cos(theta/2) Valid when: two equal vectors at angle theta; planar molecule	D (debye)
Gas volume from moles	V = nRT / P Valid when: ideal gas	L with R = 0.08314 L bar per mol K
Overall yield of a chain	product of the step yields Valid when: sequential steps; each yield applies to the previous step's amount	fraction

Full lesson with worked examples:
https://www.engineeringrise.in/learn/learn/jee-main/chemistry/organic-compounds-containing-halogens/haloalkanes-and-haloarenes

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