Halogenoalkane. ⇒ R-Hal (F, Cl, Br, I)
functional group

Alkyl (R)

- $-CH_3$: methyl
- $-C_2H_5$: ethyl
- $-C_3H_7$: propyl

: 3-bromo pentane

: 1,2-dibromo hexane

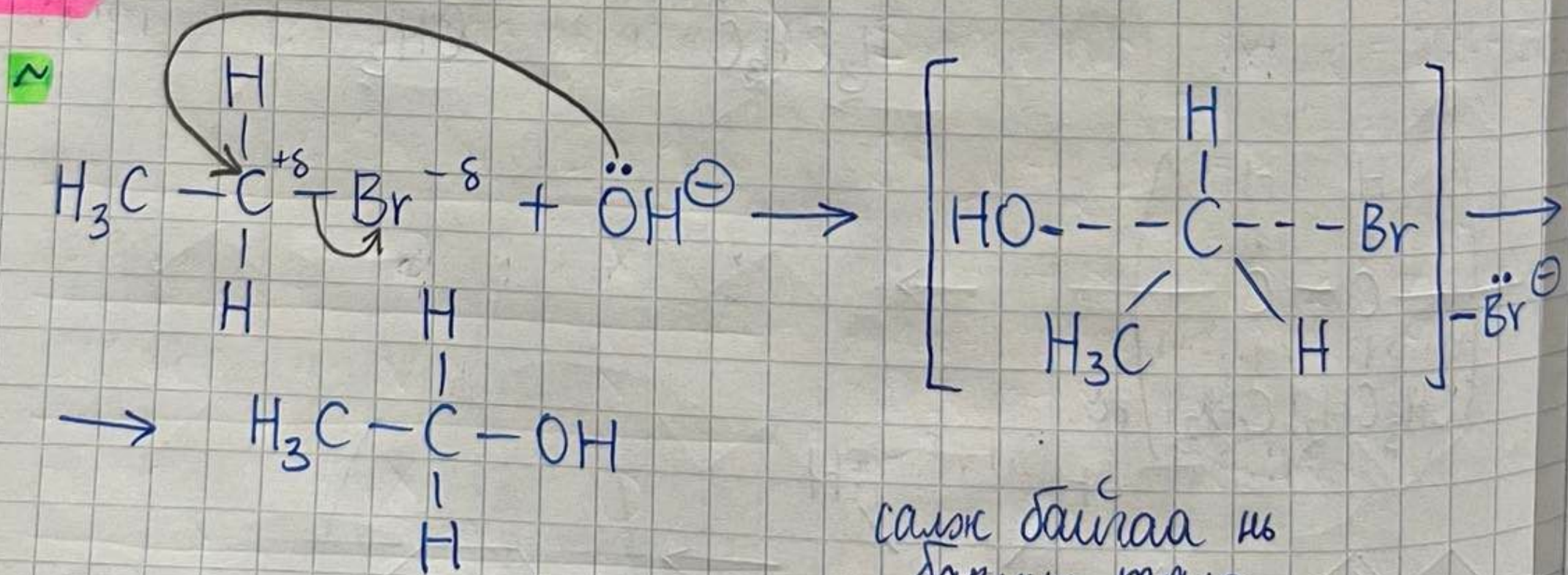
1) Substitution reactions with aqueous alkali, $OH^-(aq)$

↳ Nucleophilic substitution reaction takes place.

$$CH_3CH_2Br + OH^- \rightarrow CH_3CH_2OH + \ddot{B}r^{\ominus}$$

Nucleophile: species that can act as a donor of a pair of electrons

S_N2.



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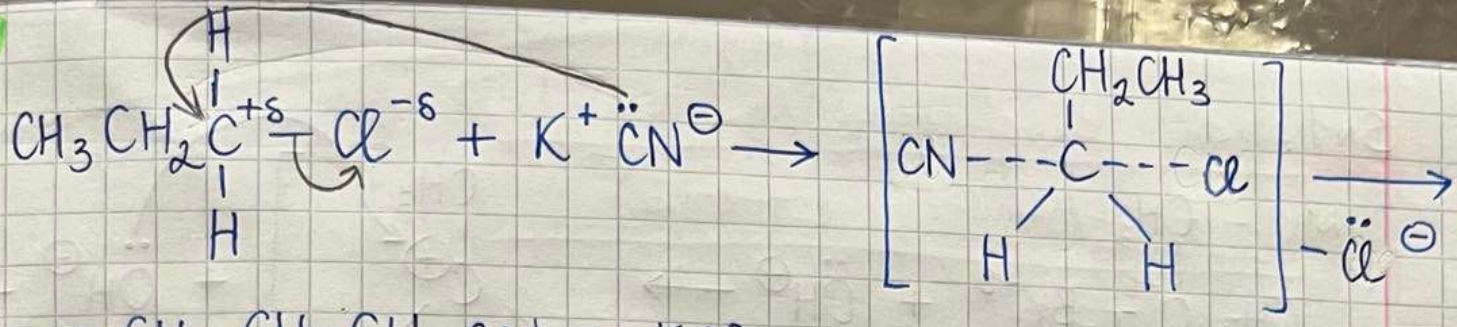
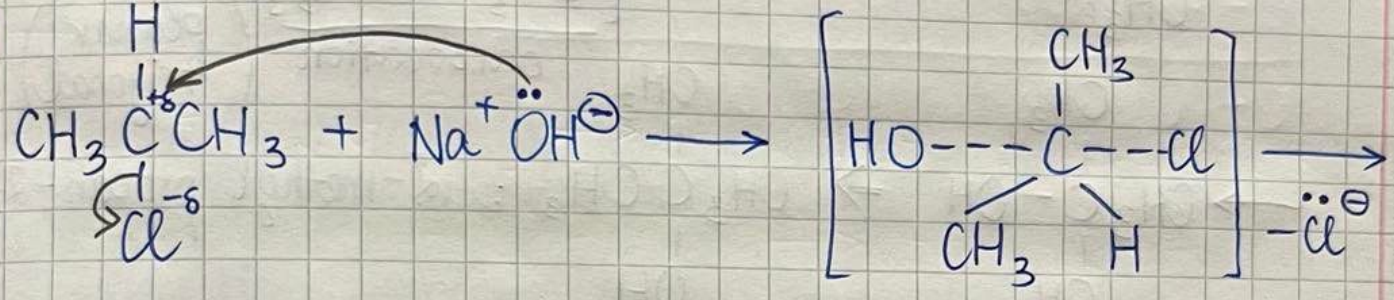


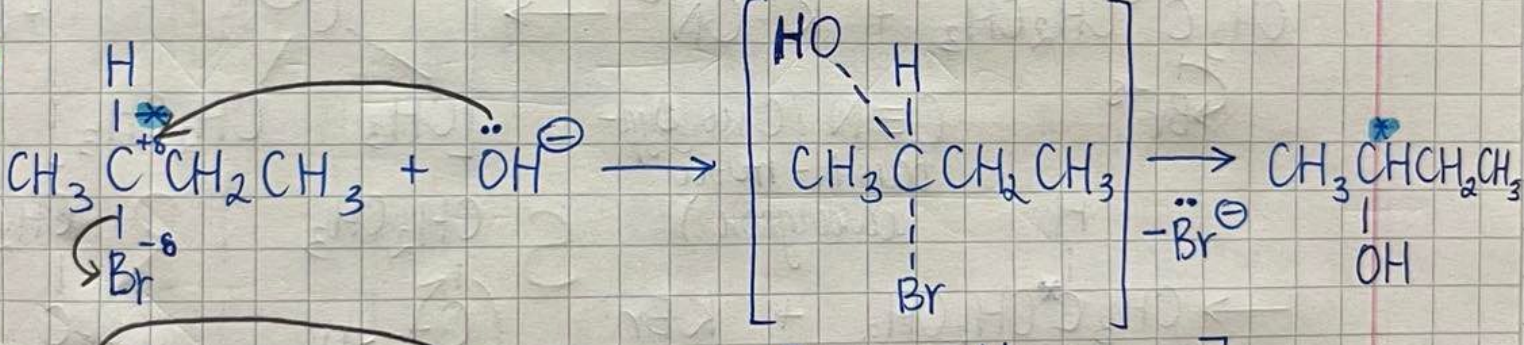
$\rightarrow CH_3CH_2CH_2CN + KCl$

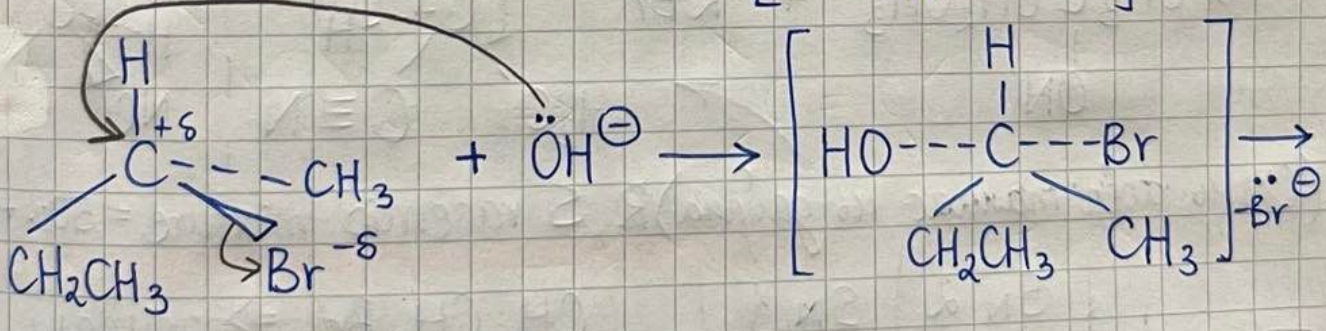
2

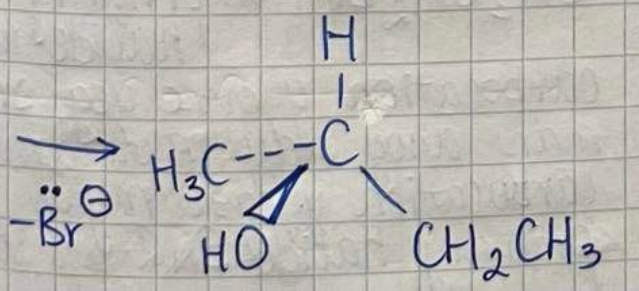


$\rightarrow CH_3CH(OH)CH_3 + NaCl$

2

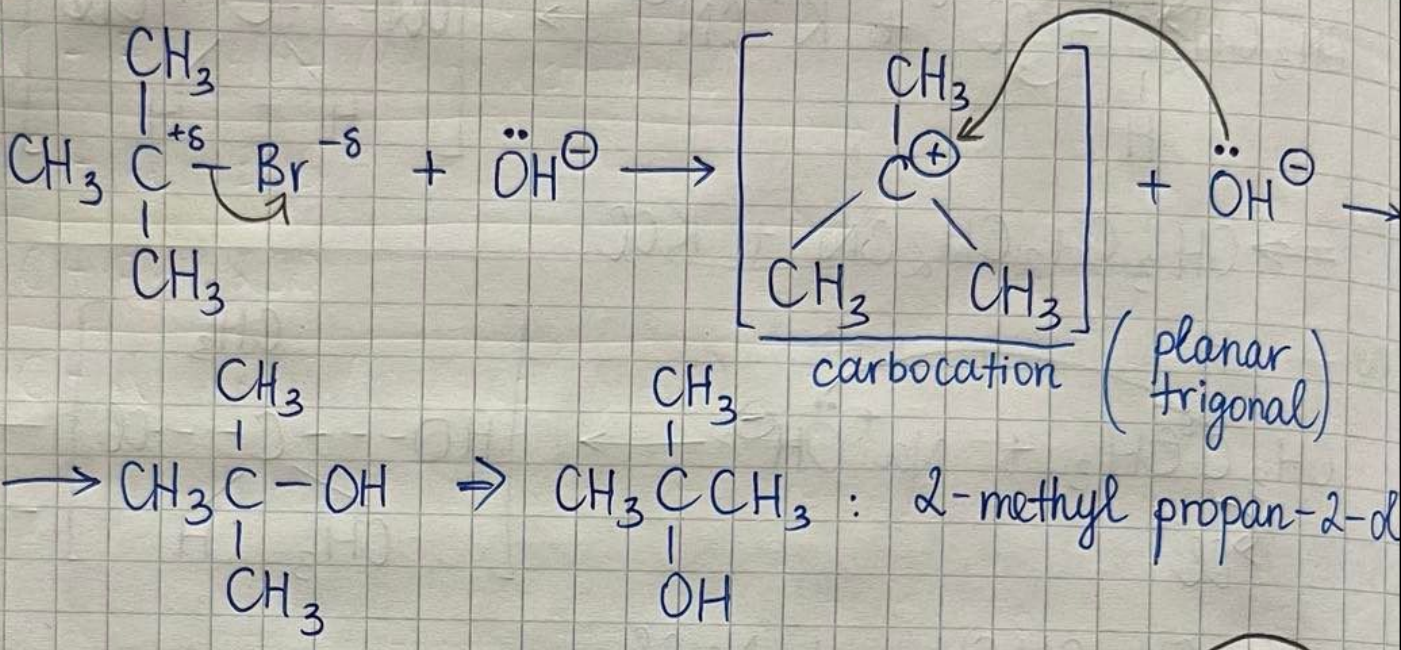


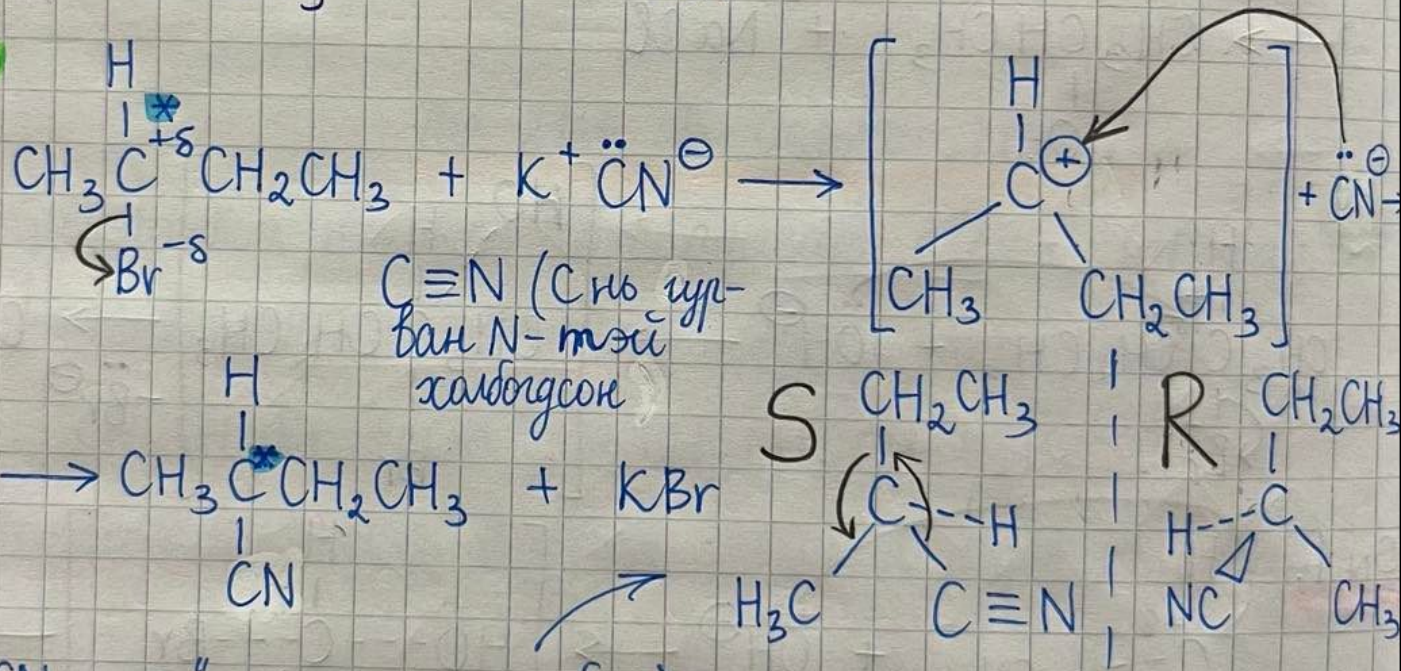




Optical isomers.

S_N1



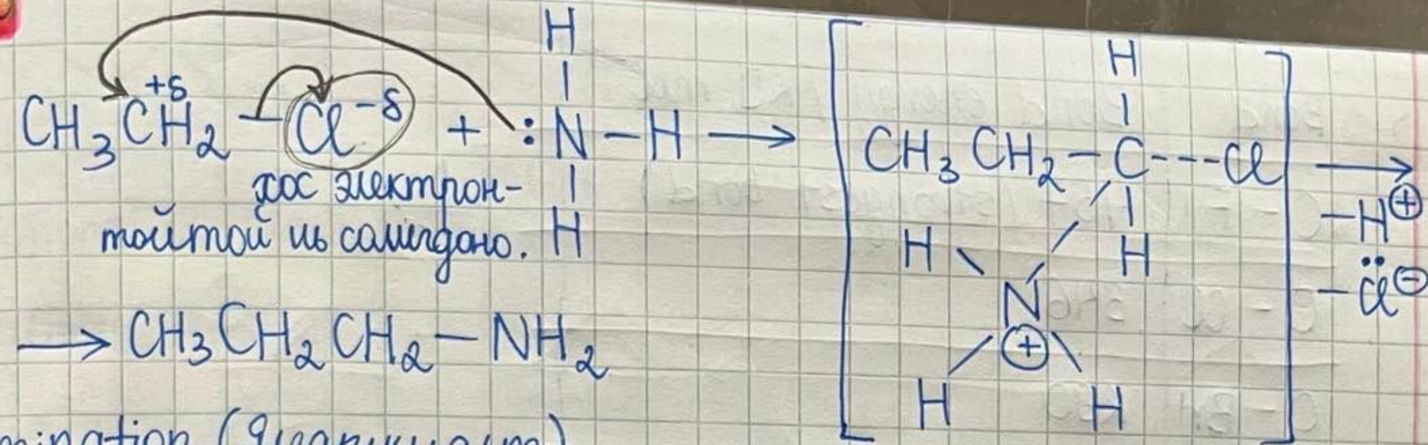


	S_N2	S_N1
primary	O	X
secondary	✓	✓
tertiary	X	O
propagation step	inter-mediate	carbo-cation

CH_3CH_2Br ⇒ primary halide нь carbocation үүсэх үед primary буюу илүү тогтвортой carbocation үүсдэг тул primary halide S_N2-оор явна.

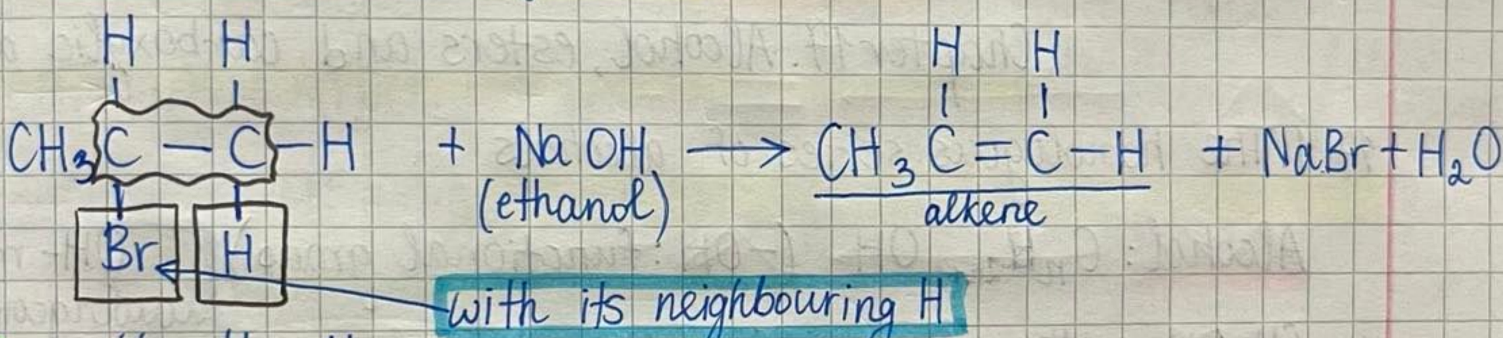
$S_N2 > S_N1$ хурдан

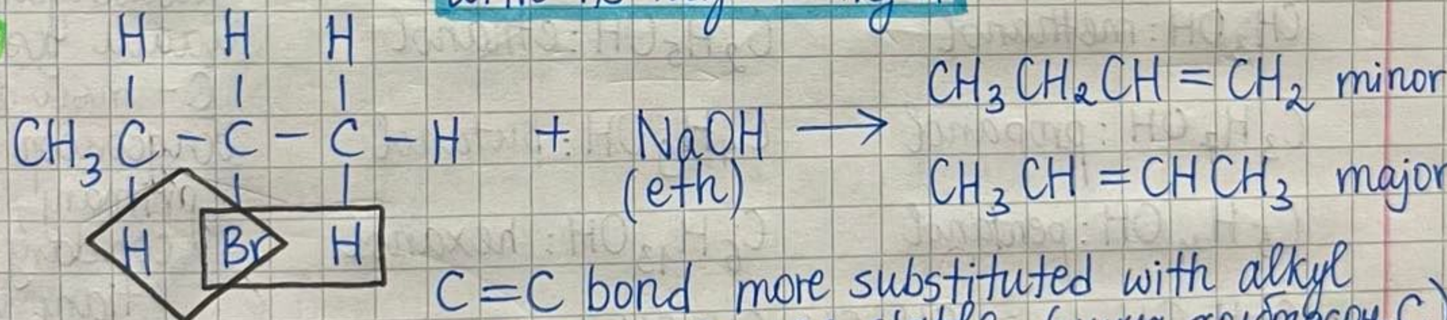
stableness of carbocation



Elimination (Ялгаруулалт)

↳ The reagent used in these elimination reaction is ethanolic sodium hydroxide.





C=C bond more substituted with alkyl group → more stable (шууд холбогдсон C)

Relative strength of the C–Hal bond

↳ The substitution reaction involves the breaking of carbon halogen bond.

fluoroalkane	↓	least reactive
chloroalkane		bond energy
bromoalkane		
iodoalkane		most reactive

↓ олон давхраатай тул сул холбогдож, амархан салдаг.

↳ the fastest nucleophilic substitution reactions take place with the iodoalkanes

↳ the slowest is with fluoroalkane

Bond	Bond energy / kJ mol^{-1}
C – F	467 (strongest bond)
C – Cl	346
C – Br	290
C – I	228 (weakest bond)