T ALKYL HALIDES HALO COMPOUNDS HALO HYDROCARBONS HALO ALKANES (RX) · They are derivatives of alkanes/alkenes General formula for haloatkanes X or simply RX (R= alkyl, X = halogen)
May be aliphatic, straight, branched, anomatic They are named as derivatives of corresponding allianes. Positions of substituents and multiple bonds are indicated. . CHzcl = methylchloride/ chloro nethane - CH3 CH - CH3 = 2-Bromopropare/ coopropy/bromide CH3-C-I = 2-lodo-2-methy/propane/tert-buty/iodide / HC = C - CHCI => 3-chloropropene CI => 0-Dichlorobenzene/benzene 2-chloropheny/chloride. $C = C \Rightarrow 2-Bromobut-2-ene/$ $CH_3 \Rightarrow CH_3 \Rightarrow CH_3 \Rightarrow CIS - 2-Bromobut-2-ene$ $C = C \Rightarrow CH_3 \Rightarrow CIS - 2-Bromobut-2-ene$ $C = CH_3 \Rightarrow CIS - 2-Bromobut-2-ene$

=> Classification Depends on the no of R groups attached to the C bearing the X atom. 1° (Primary) = (R-c-x eg CH3 CH3 CH3 CH3 I) Lodopentare/ Pentyliodide 2° (Secondary) = (R-c-x where R = R' = g CH₃ - C-Br (2- Brimo propane) where RXR eg CH₃CH₂ CH, CH, CH, 3 Iodohexane 3° (Tertian) where R=R'=R'= CH3 = = (CHz) C-CL = Text-buty/chlonde J. 5-CMm-5methy I pupare.

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top> Physical Proporties Most are liquids, except halomethanes (apar for iodonethane) are gases. Fluoroethane and chlowethane are also gases. They are polar in nature (is $\mu \neq 0$)

8+

R

X

R

X

R

They are polar in nature (is $\mu \neq 0$) ie X (arp ?) 5 more electrolrégative than C (grp! Recall electronogaturity increases from left-3 right

Japensdic table and decreases down a

group (F>>> cl > Br >> I): Because of their polar nature, They have higher boiling points, melting points and denstries than their corresponding alkanes) allogs allegnes. These parameters increase ist right. Their bpts, mpts. and densities in crease it) for same R groups, diff X atoms RJ > RBr > RCL eg CH3CH2I> CH3CH2Br> CH3CH2CI As RMM of X increases, R constant, the parameters or in crease. 1 diff R groups, same XI., parameters also increase ie As chain leight increases, bpt/npt also increases 29 CH3 CH2 CH2 CH2 Br > CH3 CH2 CH2 Br > CH3 CH2 CH2 Br > CH3 CH2 CH2 Br

R"= CH3 CH2 CH3 If R = R' = CH3CH2; CH2CH3 Br = 3-Brimo-3-ethylhexan 4 CH2 CH2 CH3 => Unsaturated allog halides = bonds c=c-c => 2-halogeno propene × eg 2-chloropropene or $\frac{1}{3}$ $\frac{2}{3}$ $\frac{2}{3}$ $\frac{1}{3}$ $\frac{2}{3}$ $\frac{2}{3}$ $\frac{1}{3}$ $\frac{2}{3}$ \frac H3C-C=C-X eg 3-halogenopripyre. Halogeno propyre eg Iodoprpyne > Any I halides (Ar-X) X is directly attached to an armatic ring (ie X replaces 1 y the Hatoms on eg a derzene ving) eg Of d (Monosubstituted benzene)

Phenocher

(Ar) X eg C6HsX

chlorobenzene 3-chloromethylbergene 10/3 cl or 3-chlosotoluene · or m-chlorotoluere or Tolylchloride (Disubstituted benzene (X-C6+14-CH3)

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Engly X atoms, decreases bots/mpts/densities. RCL. C. RCl2 < RCl4. eg chicl < chiclo < chiclo < ccl4 (for substitute). chloromethane dichloro tachloro tetrachloro methane methane methane (chloroporn) (carbon tetrachlori dichloride) 1) Changing from 1° -> 2° -> 3° RX, bpt/mpt/density
decreases (becoming more compact and:
require less energy to break, Their lattice) $R-\dot{c}-cl > R-\dot{c}-cl > R-\dot{c}-cl > R-\dot{c}-cl > R''$ (3°) =9 CH3CH2CL > CH3 - CH-CL > (CH3)3 C-CL They are water-insoluble (though polar) but soluble in organic solvents eg. Et 20, CHCl3, CHocl2, CCl4. . they do not form time isolads with important e cH3 CH2 CL + 0.8+ X (:: not soluble)

Redict the following compound which will have by the highest boost/melting point/density for the fillburng pairs: i) iodobutane and iodopentane ii) 2-chlorobutane and 2-bromobutane ii) 2-chloropropare and 2-chloro-2-neThy/propare N). Chloroform and iodoform 1) as-bromobut-2-ene and trans-bromobut-2-ene 3) Bromopropane, de though a polar compound, does no is insoluble in water. Explain. => Synthetic methods of Preparation of Rt Debotitution in Alcohols
Zucla catalyit poct + H20 eg CH3CH2OH + HBr NaBr/Conc-H2CO4 CH3CH2Cl + H2O CH3 CH₃ - C - OH + HBr NaBr/Conc. H2O4 CH₃ - C-Br + HO
CH₃ - CH₃ -Ease of substitution 3°0H > 2°0H > 1°0H

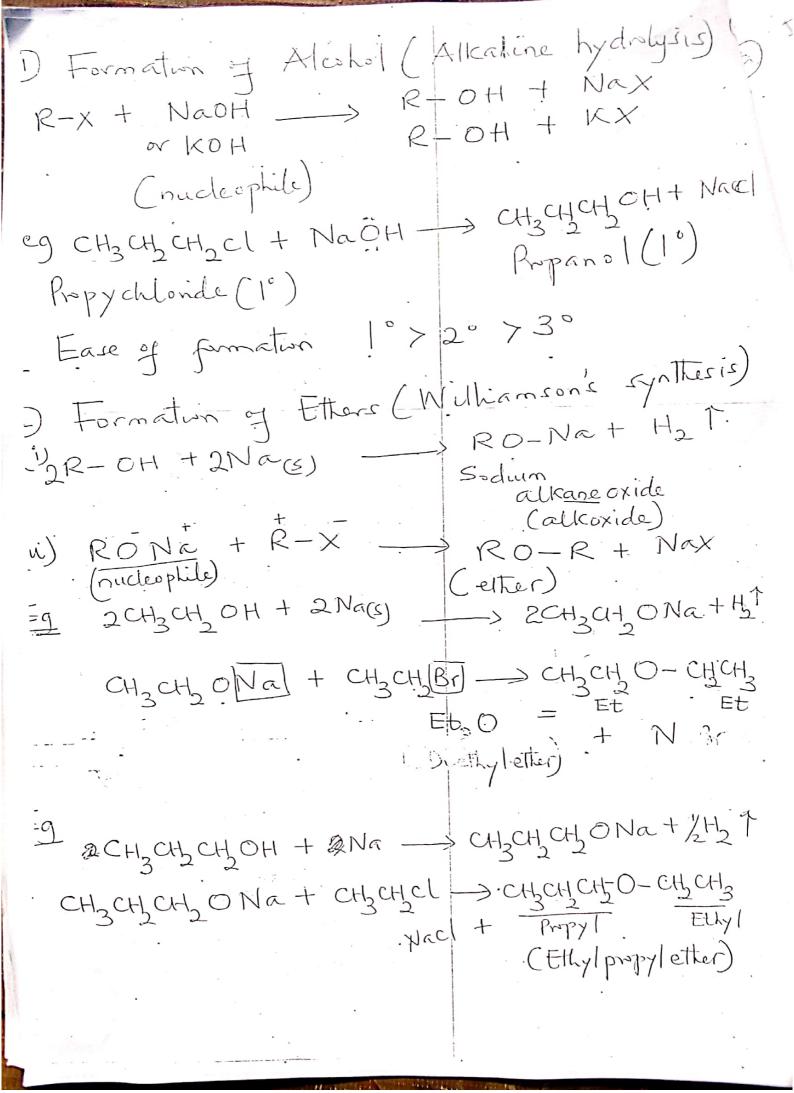
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Addition of HX to alkenes (Markovne kovie) c = c + HBr - - - - - - - - - - - - Br HC-C-C-CH3 > Reactions · Nucleo philic substitution Reactions

- Utoen Nucleophilic substitution unimolecular (SN)

- Nucleophilic substitution bimolecular (SN2) Eliminatur Reactions - Elimination Unimolecular (E1)
- Elimination bimolecular (E2) Nadeophilic Substitution Reactions Nucleophiles (groups rich in electron i gil)
Electronegative) displays X atoms in R-X Egs.if Nucleophiles - i.D.H., i.O.R., CEN, NH2 reading to formation of ROHS, RORS, (ethers)

RCN and RNH2 respectively cyanides (animes) nitales).



Formation of Amines (Hoffmann Amminolysis) RX + NH3 Dinal R-NH2 + HX

(alcoholic) Sealed tube (Amire). eg This yields a mixture of amines.

Eg CH3CH3Cl + NH3

(FHOH)

(Parnine) ethylanin CH3CH3NH3 + CH3CH2 A HG-CH2N-H+ t (fresh RX)

CH3CH3

CH3CH3N

CH3CH3N

CH3CH3N = (CH3 CH3), NH Diethylamine (2am CH3CH3/NH + CH3CH3Cl CH3CH3 + HCl CH2CH3 = (CH3CH3) N (3°amin Triethy amine 1) Formation of cyanide nitrile derivatives R+CN+ HX RX+HCN EHOH RICN + Nax NaCN ->> R+CN+XX KICH ---(nutrile)

CH3CH2CL + NaCEN EXON CH3CH2C=N + Nach .. Propanonitale/ Ethy Cyanide Alkanes Chait imadaophi) Formation of EtaOs RIMAX ally Magnesium habide RX + Mg (Grignard reagents) R-H+ Mg(OH)X dil H+ RMgx+ H20 Magnesium kydroxyl halide Calkane) Mg(X) OH Magnesium halo hydroxide eg CHzCHzBr+Mg ElaO> CHzCHzMgBr Ethyl magnesium bromide Ethylbromide HT H20 CHICHS + MA (OH) Br (Ethane) (Magnesium hydroxyle bromide) Mg (Br) OH Mapreium bromo hydrexide 3 Cd. Formation of Alkynes $\longrightarrow R-C=C-R'$ R-X + Na-C=C-R'

(metal derivative

g agrallyne) > ct3ct; c= c-ct3+No eg CHZCHJI + NaCCCH3 (Pent-2-12) B) Elimination Reactions (Dehydrohalogenatur Reactions)

Reactions

Reactions eg HC-C-CH2 alckott HC-C=CH2
(Propene) (Argyt 2 - chloro proporce) $CH_3 - C = CH_2$ CH3 - CH3 alc KOH Ease; 3°>2°>1°. RX.