

LEC (24)

CHEM 30A

Mar 11th

(1)

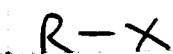
- ① S_N vs E
- ② SYNTHESIS
- ③ HALOALKANES
- ④ PREPARATION

READ 7.1-7.6

PROBLEMS 7.1-7.3

① } PAGES 7-9 of Lec (23)
② }

③ HALOALKENES
(halogens F, Cl, Br, I)



alkyl halide



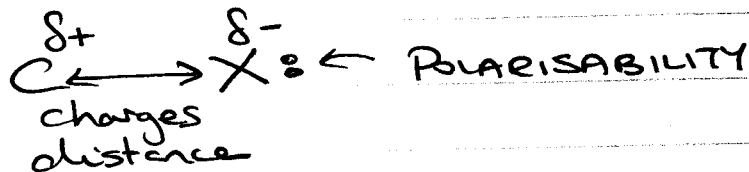
vinyl halide



aryl halide

— read through naming rules (not so hard)

POLARITY



	EN of X	C-X (pm)	DIPole moment (D)
CH ₃ F	4.0	139	1.85 D
CH ₃ Cl	3.0	178	1.87 D
CH ₃ Br	2.8	193	1.81 D
CH ₃ I	2.5	214	1.62 D

↑
N
↓
N

BOILING POINTS

R-X	H	F	Cl	Br	I	
e.g. CH ₃ CH ₂ -	-89	-37	13	38	72	°C

polarisability (DISPERSION FORCES)

BOND LENGTHS & STRENGTHS

Strength of bonds → BOND DISSOCIATION ENERGIES (BDE)

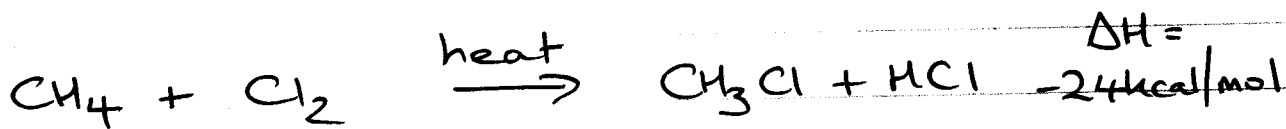
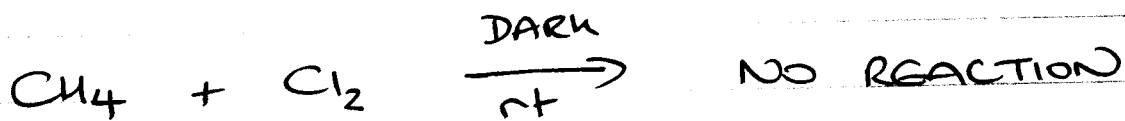


	LENGTH (pm)	BDE (kcal/mol)
C-H	109	90-100
C-F	142	105
C-Cl	178	80
C-Br	193	65
C-I	214	50

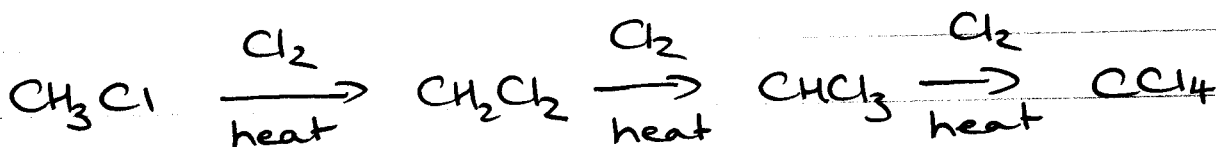
(4) PREPARATION



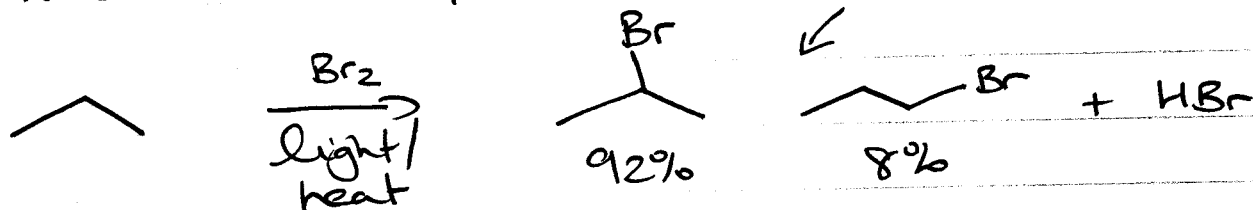
3



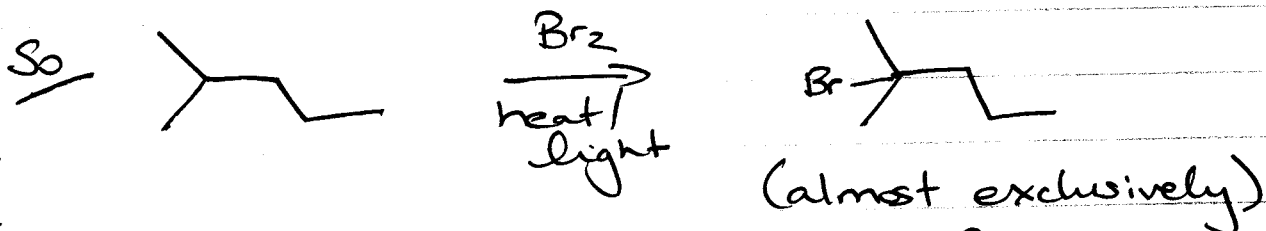
reaction continues:



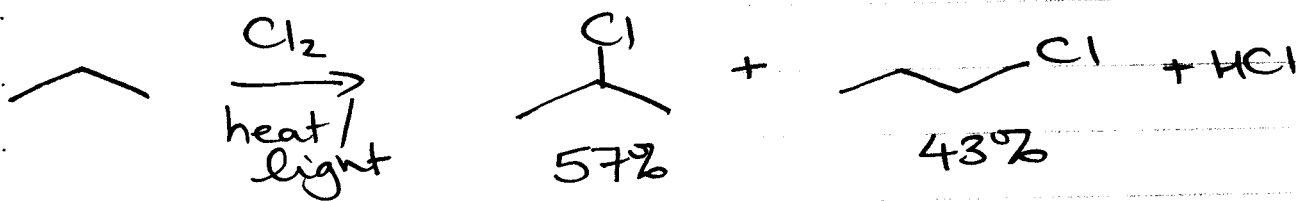
- REGIOSELECTIVITY



Sub of 2° H favored over 1° H
(also 3° favored over 2°)

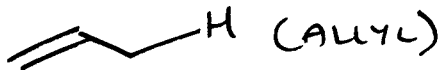








REGIOSELECTIVITY LESS PRONOUNCED FOR CHLORINATION



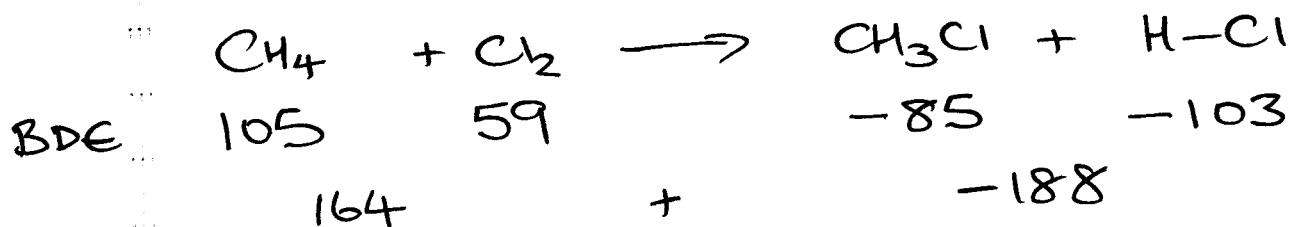
3°/2°/1° 1600 : 80 : 1 Br
 5 : 4 : 1 Cl

ENERGETICS OF RADICAL REACTIONS

C-H BOND	BDE (kcal/mol)
 (ALLYL)	86
 (BENZYL)	88
 (t-BUTYL)	93
 (i-PROPYL)	96
 (ETHYL)	100
 (METHYL)	105
 (VINYL)	106

↑
RADICAL STABILITY INCREASES

So, for:



$\Delta H = -24 \text{ kcal/mol}$ (EXOTHERMIC REACTION)