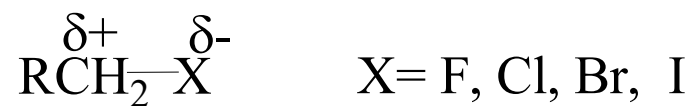


Chapter 7: Part 2: Substitution Reactions – SN1

1. The SN1 Mechanism
2. Factors Affecting SN1 Reactions
 1. The Leaving Group
 2. The Nucleophile
 3. Carbocation Intermediate
 4. Steric Hindrance
3. Stereochemistry

Alkyl halides have relatively good leaving groups -
How do alkyl halides react?



an SN2 reaction....

Experimental Evidence for an S_N1 Reaction

1.

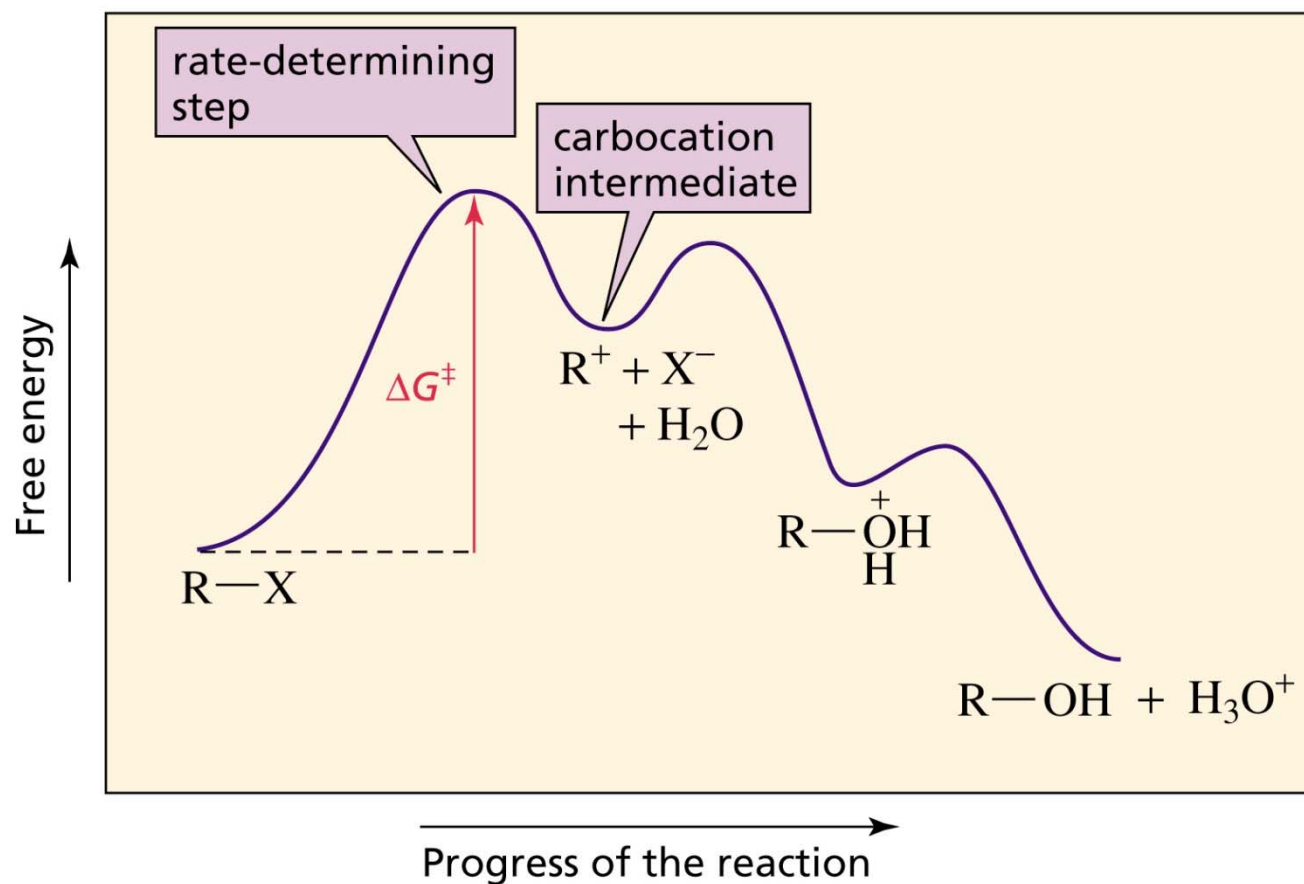
2.

3. In the substitution of a chiral alkyl halide, a mixture of products is obtained.

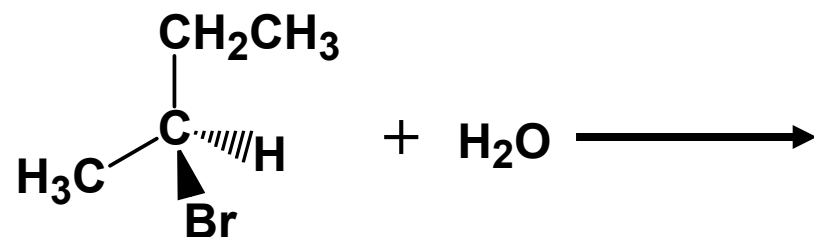
The SN1 reaction:

Substitution Nucleophilic *Unimolecular*

Reaction Coordinate Diagram for an S_N1 Reaction



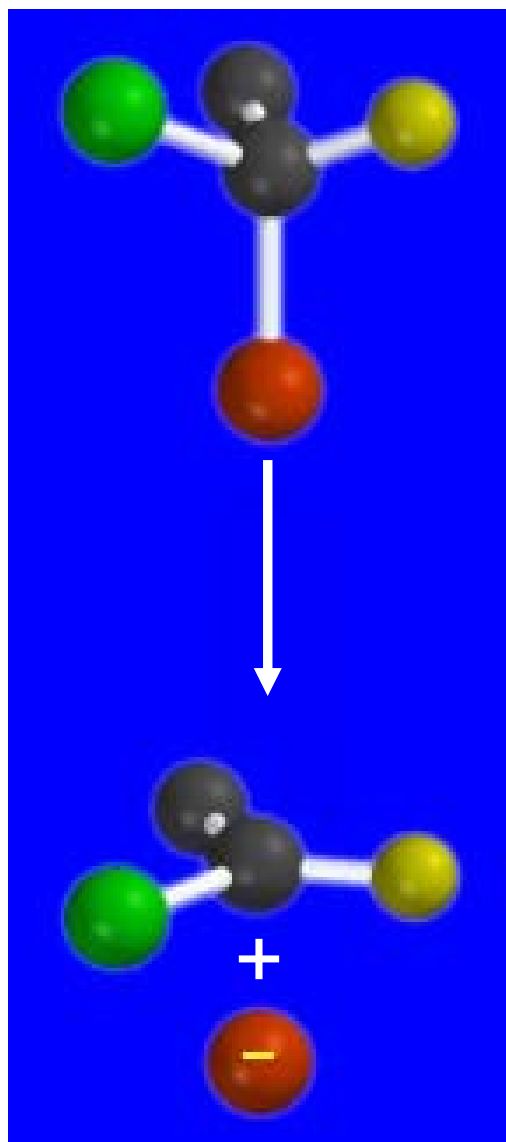
The Stereochemistry of S_N1 Reactions



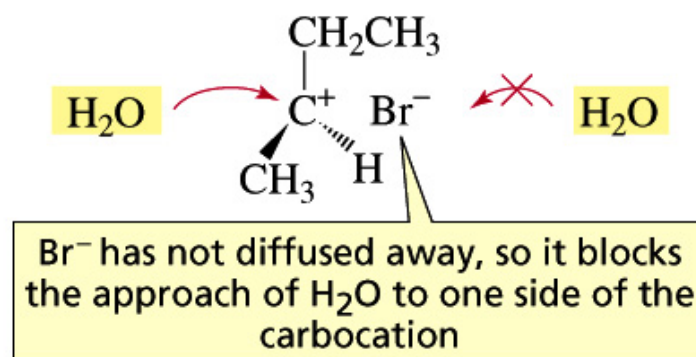
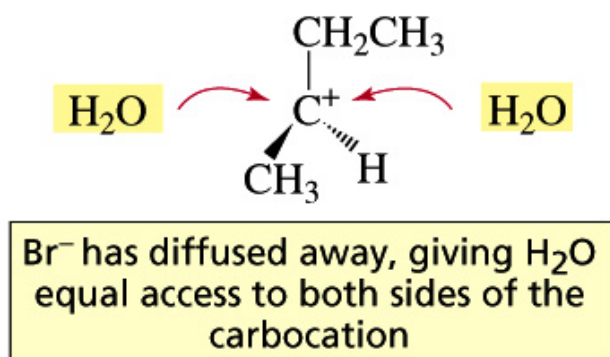
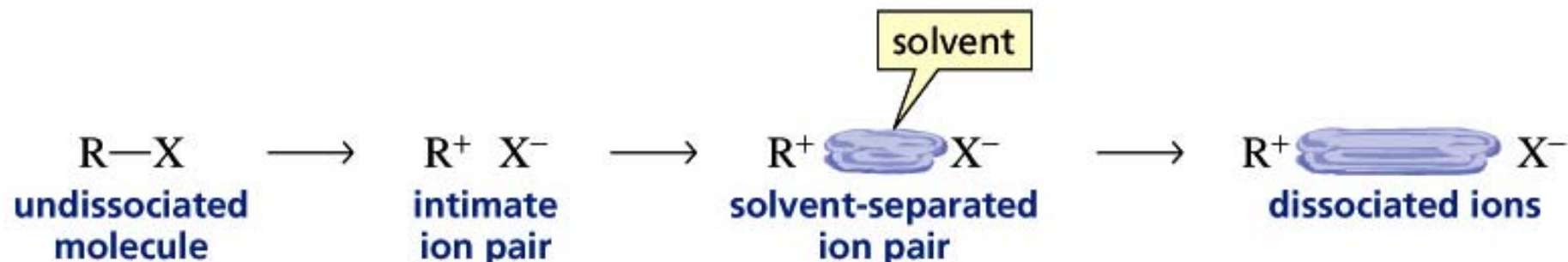
(S)-2-bromobutane



-

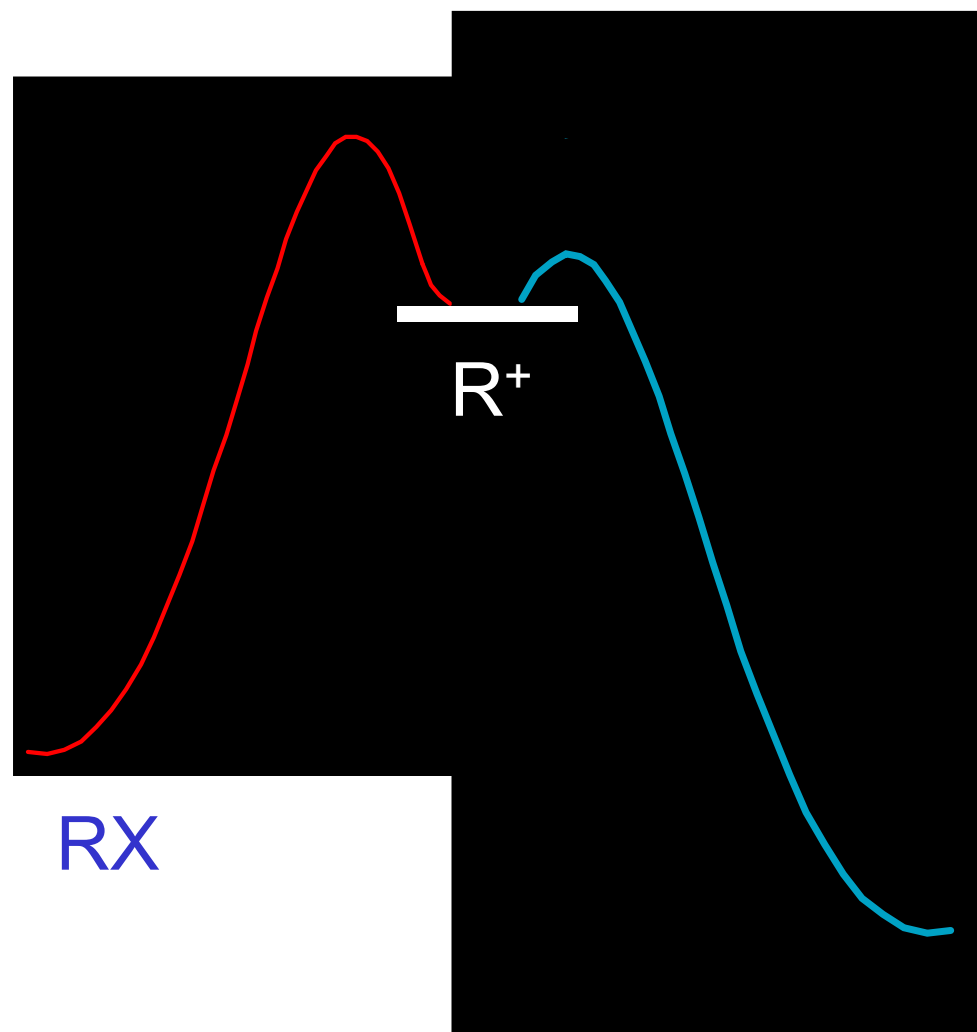


Sometimes extra inverted product is formed in an S_N1 reaction because ...



S_N1 Reactivity versus Solvent Polarity

Solvent	Dielectric constant	Relative rate
acetic acid	6	
methanol	33	
formic acid	58	
water	78	

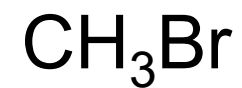
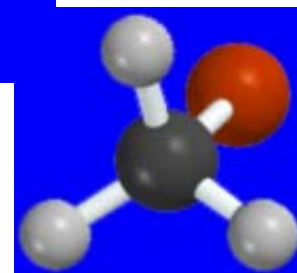
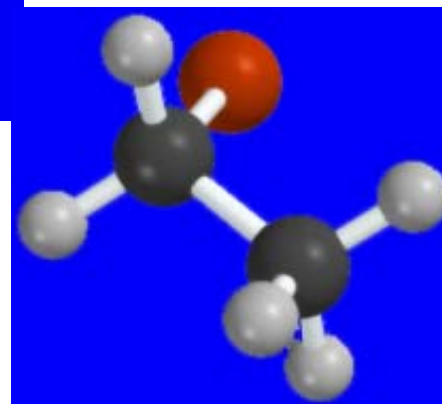
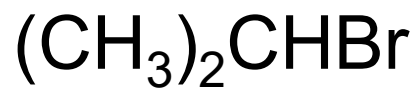
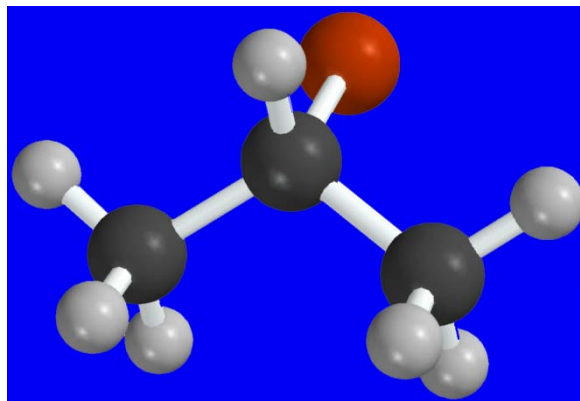
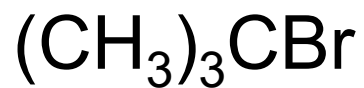
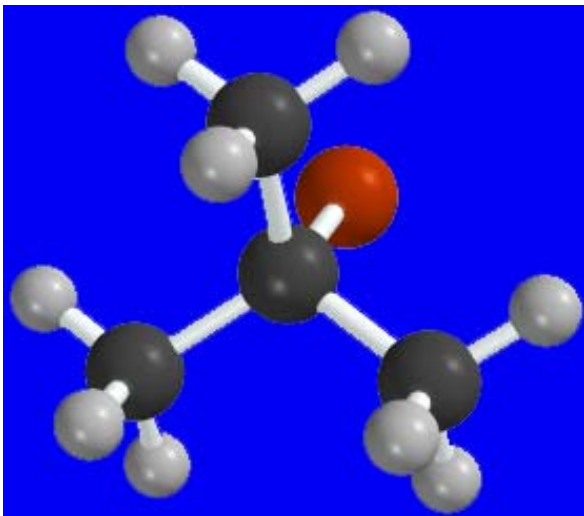


Reactivity toward substitution by the S_N1 mechanism

RBr solvolysis in aqueous formic acid

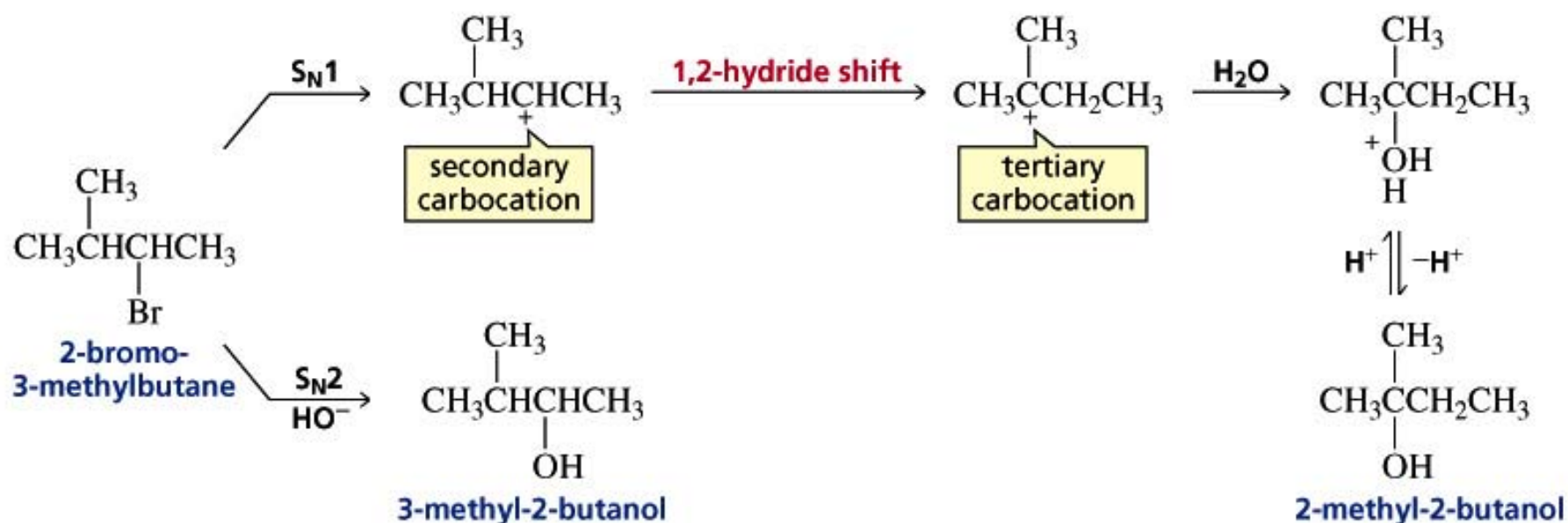
<u>Alkyl bromide Class</u>		<u>Relative rate</u>
•CH ₃ Br	Methyl	1
•CH ₃ CH ₂ Br	Primary	2
•(CH ₃) ₂ CHBr	Secondary	43
•(CH ₃) ₃ CBr	Tertiary	100,000,000

Decreasing S_N1 Reactivity



Finally,

When a reaction forms a carbocation intermediate, always check for the possibility of a **carbocation rearrangement**



Characteristics of the S_N1 mechanism

For Next Time....

FRIDAY Chapter 7: Alkenes and Eliminations (7.5-7.8)

NEXT MONDAY Chapter 7: Unimolecular Reactions (7.9-7.10)

NEXT WEDNESDAY Chapter 7: Putting it all together

Suggested Homework Problems Chapter 7

#1,3,5,16, 18, 21, 37, 41, 47, 48, 54, 56, 60, 62-65, 70, 76