Structure-Reactivity and the Haloalkane

favors S_N1

Governed by electronic factors

Carbocation stability

$R_3C–X$	$R_2CH–X$	$RCH_2–X$	$CH_3–X$
(3°)	**(2°)**	**(1°)**	**(methyl)**

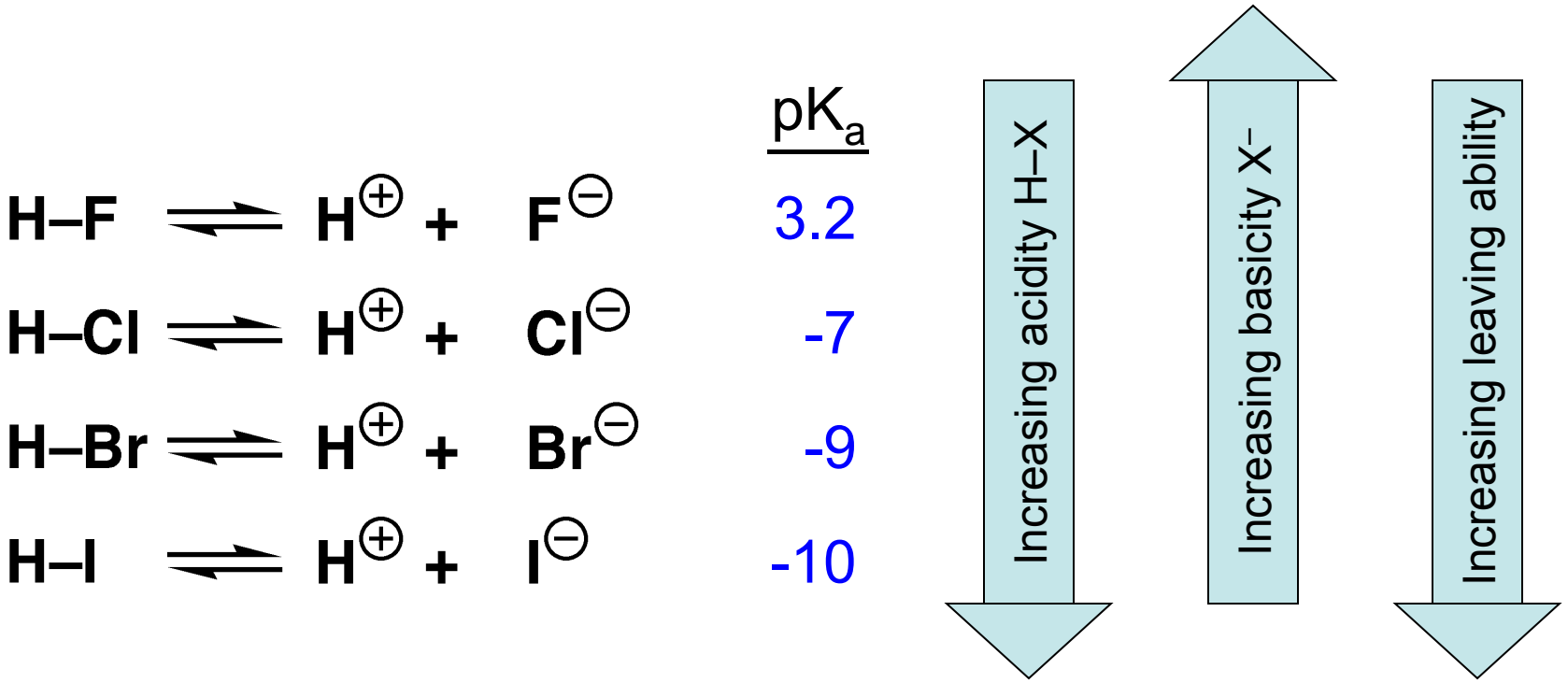
Access to the site of reaction

Governed by steric factors

favors S_N2

Recognizing Leaving Groups (L)

Leaving group reactivity correlates to basicity.
The weaker the base, the better its leaving ability.



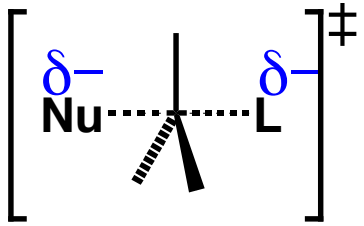
This general trend holds for [S_N2], [S_N1] and other reactions that we'll study

	relative rates of reaction
$HO^- + RCH_2I \longrightarrow RCH_2OH + I^-$	30,000
$HO^- + RCH_2Br \longrightarrow RCH_2OH + Br^-$	10,000
$HO^- + RCH_2Cl \longrightarrow RCH_2OH + Cl^-$	200
$HO^- + RCH_2F \longrightarrow RCH_2OH + F^-$	1

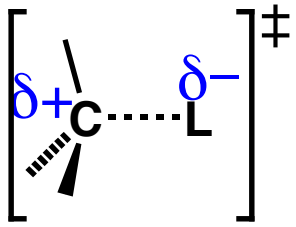
From Paula Y. Bruice *Organic Chemistry* 4th Ed. Pearson

Why Does L Correlate to Basicity?

In the TS≠ (RDS), the leaving group develops negative charge; thus, the ability of a group to function as a leaving group is related to the stability of the corresponding anion

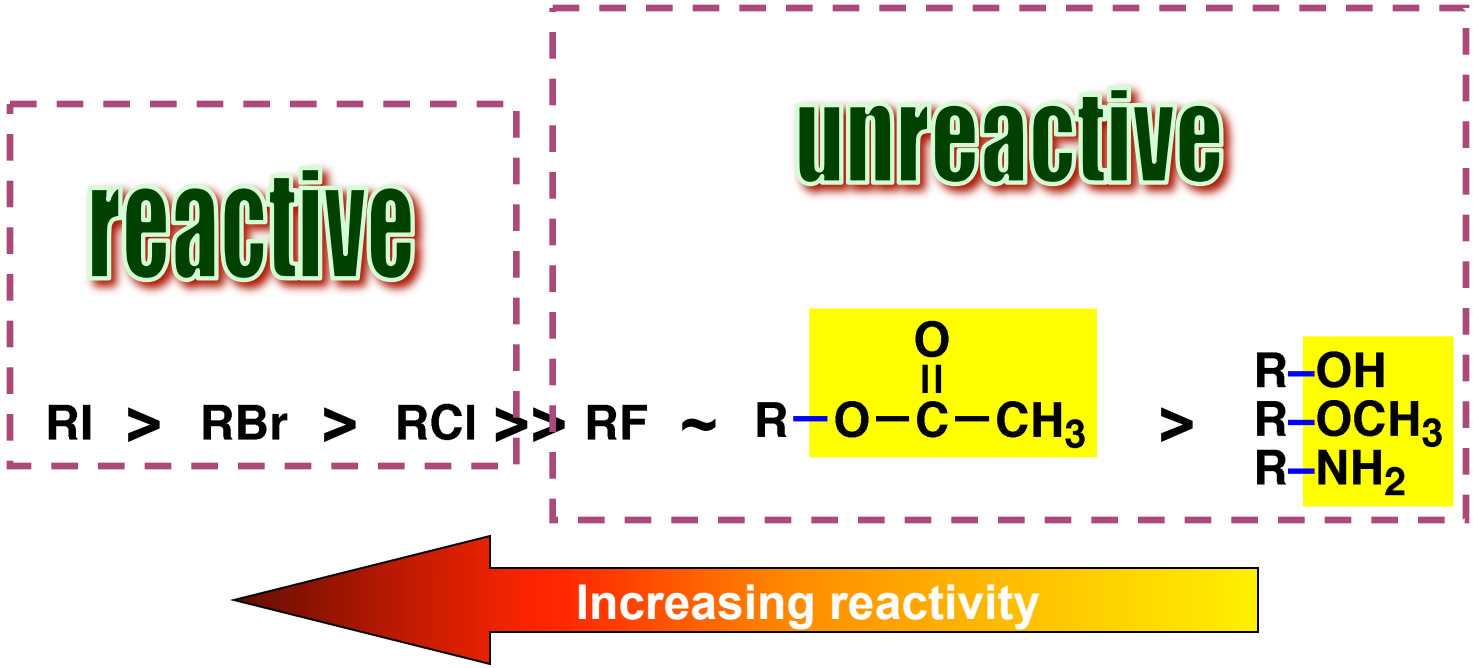


TS≠ for S_N2



TS≠ for S_N1

The List of Good Leaving Groups is Short



Not only is it important to recognize what qualifies as a good -L, but it is equally important to recognize what is not a good -L