

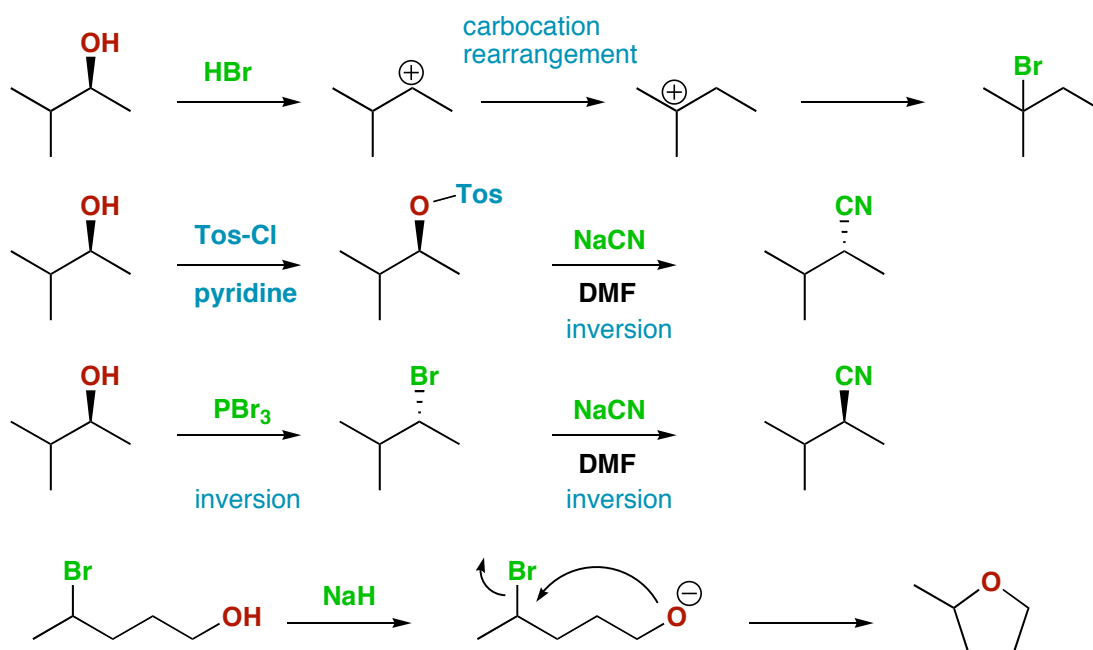
Chapter 11 - Reactions of Alkyl Halides: Nucleophilic Substitutions and Eliminations

S_N1 and S_N2 Comparison

Below is a table comparing the features important for each mechanism for substitution. The substrate type is probably the most important factor.

	S_N1	S_N2
SUBSTRATE	$3^\circ \gg 2^\circ > 1^\circ$	$1^\circ > 2^\circ \gg 3^\circ$
NUCLEOPHILE	Weak OK	Strong
LEAVING GROUP	Stable Anions	Stable Anions
SOLVENT	Polar Protic	Polar Aprotic
STEREOCHEM	Racemic	100% inversion

Here are some examples of the affects of these mechanisms on the reaction of an alcohol. Note that carbocations generated during S_N1 reactions can undergo rearrangements. An alcohol can be activated into a leaving group two ways . . . making a tosylate or making a halide. Note that the tosylate formation does not alter the C-O bond stereochemistry whereas PBr_3 or $SOCl_2$ will invert the alcohol stereochemistry when the halide is formed. Nucleophiles and halides in the same molecule can undergo cyclization reactions.



Multistep Synthesis Examples

Several examples of multistep processes are shown below. You should think about how you would make the products given the starting materials shown.

