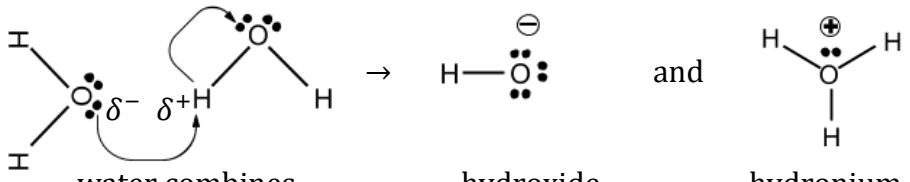
S_N2 Reactions

S Substitution
N Nucleophilic
2 Rate limiting step in reaction involves the 2 reactants

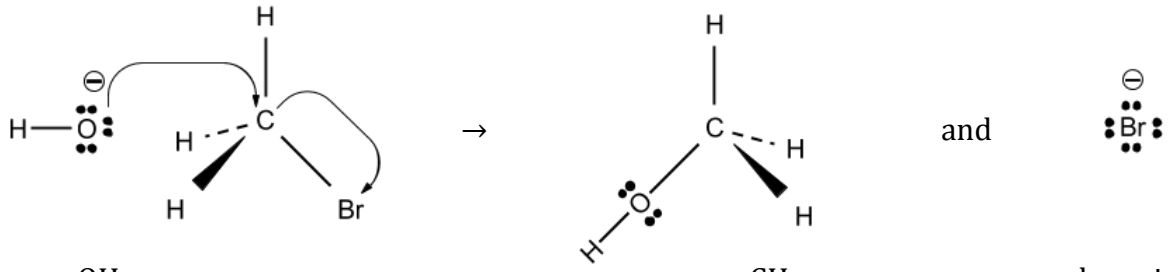
Nucleophile Negatively charged
Wants to donate an electron
Attracted to nucleuses since they are positively charged

Formation of hydroxide and hydronium from water molecule interaction



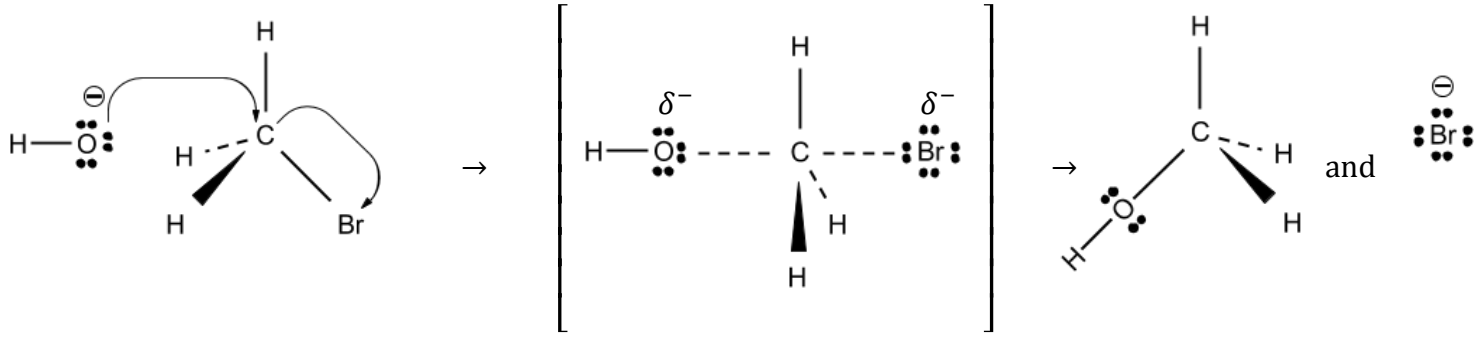
water combines hydroxide nucleophile hydronium

An S_N2 reaction that occurs in one step



OH nucleophile CH_3 substrate bromide leaving group

Intermediate Step ≠



Transition state is indicated with brackets and ≠ symbol. This step is not a semi stable intermediate step. This step determines the rate of the reaction since it represents the highest energy state for the reaction. It is an S_N2 reaction since both the hydroxide and the methyl bromide are involved in the rate limiting step.