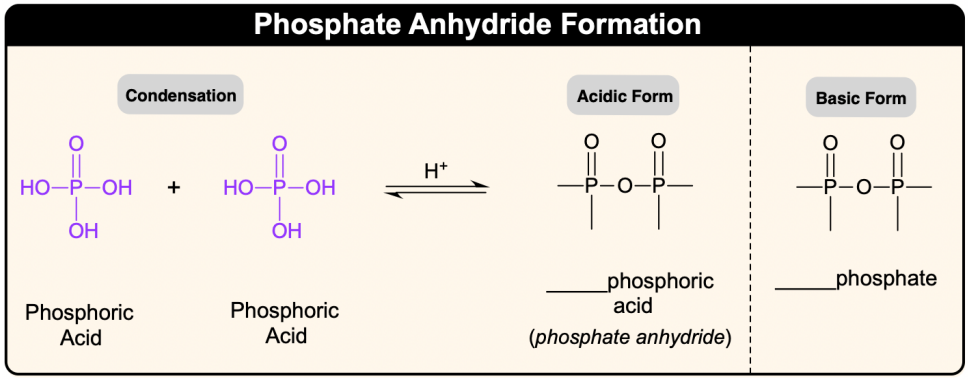
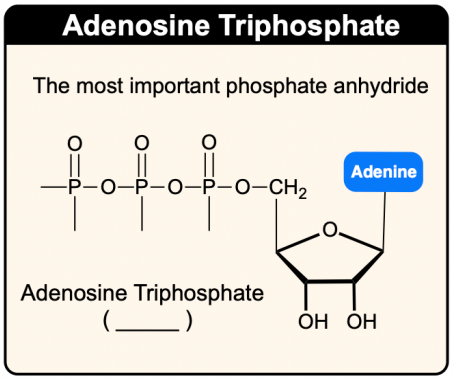
CONCEPT: INTRO TO PHOSPHATE ANHYDRIDES

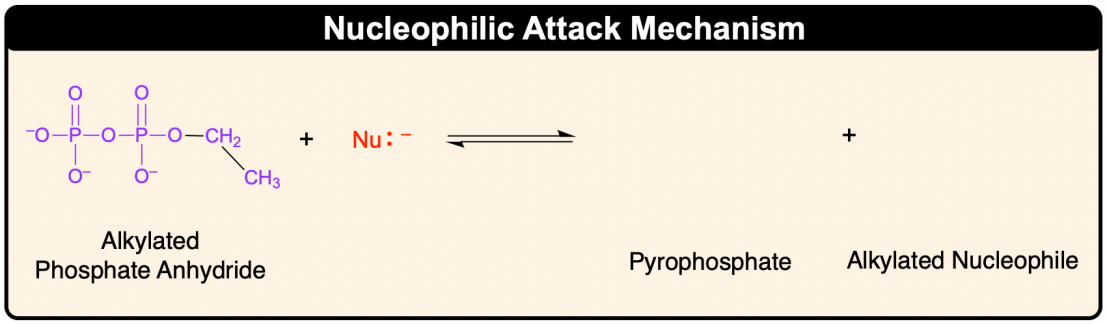
- A phosphate anhydride consists of ____ or more phosphate groups linked together.
  - □ The simplest neutral form is _____phosphoric acid.
    - Formed by the condensation reaction between 2 phosphoric acid molecules.
    - Slightly _____ environment of biological systems makes _____phosphate predominant.





Alkylated Phosphate Anhydride

- Alkylated phosphate anhydrides undergo nucleophilic attack that leads to _____ cleavage.
  - □ The nucleophile attacks the α-carbon giving products via a _____ S_N2 mechanism.
    - A pyrophosphate ion and an _____ nucleophile are formed.

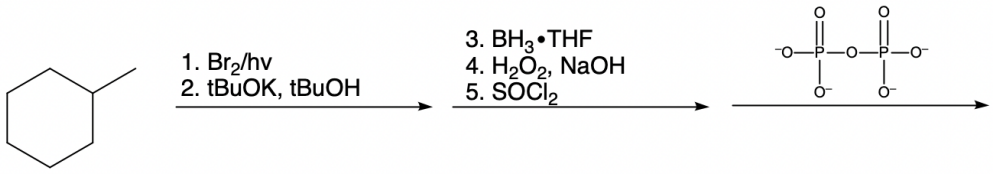


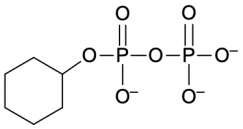
- The overall process can be made _____ upon enzyme-catalyzed NAS of the pyrophosphate ion.

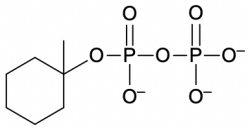
EXAMPLE: Provide the mechanism for the reversible nucleophilic attack of propyl diphosphate with the iodide ion.

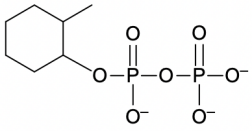
CONCEPT: INTRO TO PHOSPHATE ANHYDRIDES

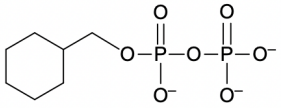
PRACTICE: Using methylcyclohexane as a starting material, predict the final product based on the list of reagents given?



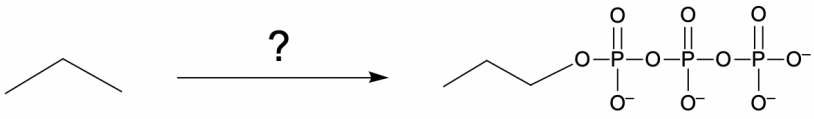
a) 

b) 

c) 

d) 

PRACTICE: Beginning from propane, determine the chemical steps needed to prepare the following compound.



a) 1. Br_2/hv
2. $NaNH_2$
3. BH_3 • THF
4. H_2O_2, NaOH
5. $SOCl_2$
6. Triphosphate

b) 1. Br_2/hv
2. $NaNH_2$
3. H_3O^+
4. $SOCl_2$
5. NH_3
6. Triphosphate

c) 1. BH_3 • THF
2. H_2O_2, NaOH
3. $SOCl_2$
4. Triphosphate

d) 1. HBr
2. Triphosphate
3. $SOCl_2$