

CAIE Chemistry A-level

Topic 19 - Nitrogen Compounds

Flashcards

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What is the general formula of a primary amine?



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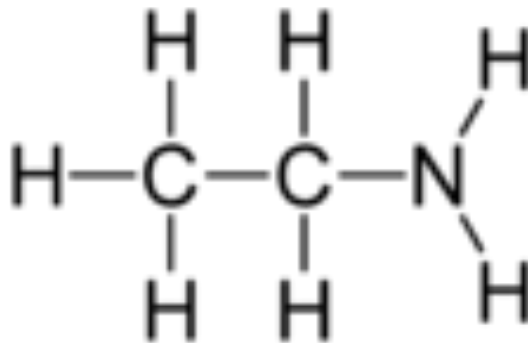
where R is any alkyl group.



Draw the displayed formula of
ethylamine



Draw the displayed formula of ethylamine



Describe how to form an amine from a halogenoalkane



Describe how to form an amine from a halogenoalkane

Heat the halogenoalkane in a sealed tube with concentrated ammonia and an ethanol solvent.



Why can reflux not be used to form an amine from a halogenoalkane?



Why can't reflux be used to form an amine from a halogenoalkane?

Ammonia is too volatile so it would escape from the reaction vessel.



Why is excess ammonia used when forming a primary amine from a halogenoalkane?



Why is excess ammonia used when forming a primary amine from a halogenoalkane?

So that further substitution reactions do not occur. If ammonia is not in excess then a secondary or tertiary amine or quaternary ammonium salt may form.



Describe how to form a primary amine
from a nitrile



Describe how to form a primary amine from a nitrile

Two options:

- Reduction using LiAlH_4 as a reducing agent.
- Reduction using a nickel catalyst and H_2 gas.

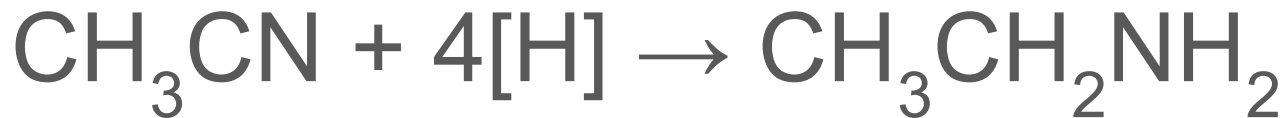


Write an equation for the formation of ethylamine from ethanenitrile

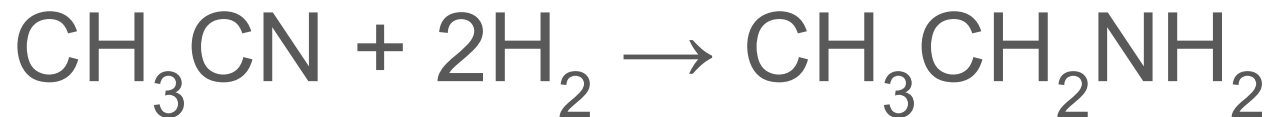


Write an equation for the formation of ethylamine from ethanenitrile

If LiAlH_4 is used:



If Ni/H_2 is used:



How can nitriles be produced?



How can nitriles be produced?

Heat halogenoalkanes with ethanolic KCN.



Name the mechanism in which hydroxynitriles can be produced from aldehydes and ketones



Name the mechanism in which hydroxynitriles can be produced from aldehydes and ketones

Nucleophilic addition



How can nitriles react to produce
carboxylic acids?



How can nitriles react to produce carboxylic acids?

To produce a carboxylic acid, the nitrile undergoes acid/base hydrolysis, followed by acidification.

