

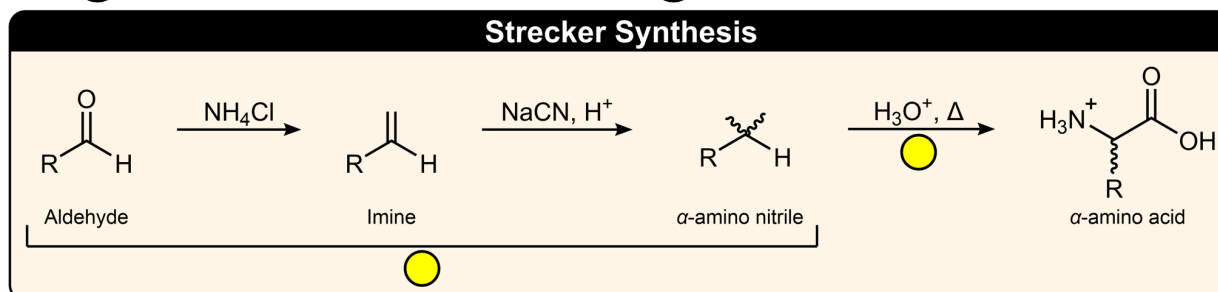
CONCEPT: SYNTHESIS OF AMINO ACIDS: STRECKER SYNTHESIS

- Strecker synthesis is an extension of _____ formation and _____ formation.

□ Takes place in two steps:

① Formation of α -amino nitrile

② Hydrolysis of α -amino nitrile



Strecker Synthesis Mechanism

Step 1

Protonation

Step 2

Nucleophilic Attack

Step 3

Proton Transfer

Step 4

Leaving Group

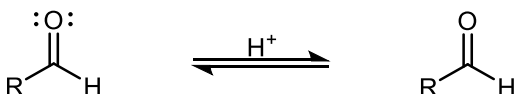
Step 5

Nucleophilic Attack

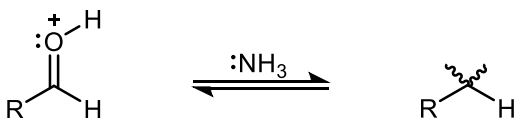
Step 6

Hydrolysis

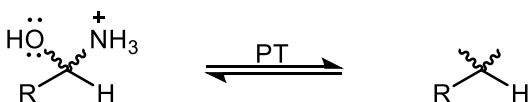
STEP 1: Protonation takes place at the carbonyl ____.



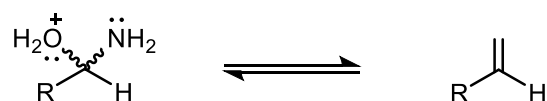
STEP 2: NH_3 attacks the carbonyl ____ forming a tetrahedral intermediate.



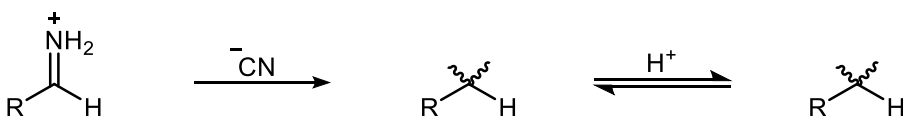
STEP 3: A H^+ is transferred from ____ to ____.



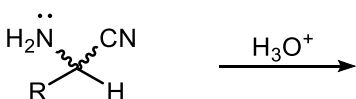
STEP 4: The amino group kicks out ____, forming a protonated imine.



STEP 5: Cyanide ion attacks the protonated imine to form the α -amino nitrile.



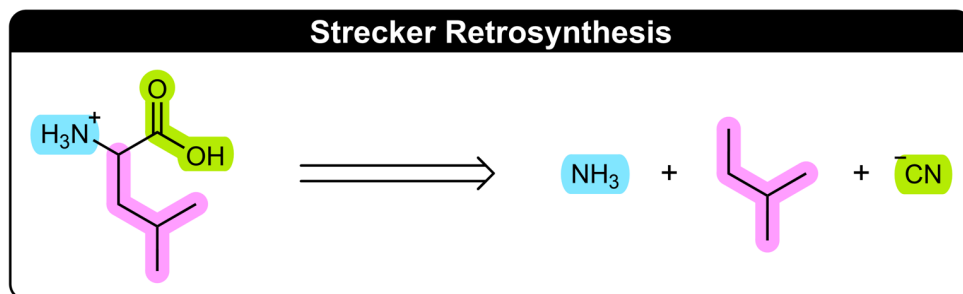
STEP 6: The ____ group of the α -amino nitrile is hydrolyzed to ____ to yield the amino acid.



CONCEPT: SYNTHESIS OF AMINO ACIDS: STRECKER SYNTHESIS

Synthesis of Amino Acids

- Strecker synthesis produces α -amino acids from aldehydes.
 - The amino group comes from _____.
 - The side chain and the _____ come from an aldehyde.
 - The _____ group comes from _____.



EXAMPLE: Suggest an aldehyde that can be used to synthesize methionine using Strecker synthesis.

PRACTICE: Draw a complete mechanism for the Strecker synthesis of alanine.

CONCEPT: SYNTHESIS OF AMINO ACIDS: STRECKER SYNTHESIS

PRACTICE: Pipecolic acid is an unusual amino acid that accumulates in the bodies of people with pipecolic acidemia, a rare genetic disorder. Write a synthetic method to prepare pipecolic acid using Strecker synthesis.