

34 Primary and secondary amines — Part 1

Name: _____ Class: _____ Date: _____

Vocabulary 词汇

Write each word three times. 把每个单词抄写三遍。

English	中文	Write it 3 times (English)
amine	胺	_____
halogenoalkane	卤代烷	_____
reduction	还原	_____
nitrile	腈	_____

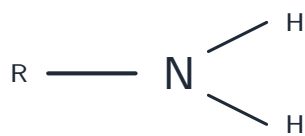
Recall

An **amine** 胺 has nitrogen bonded to carbon. It is **primary** ($-\text{NH}_2$) or **secondary** ($-\text{NH}-$).

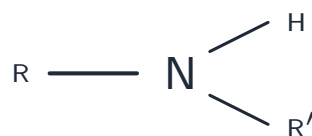
New ideas

Read these first, then do the Practice.

■ 1 Primary and secondary



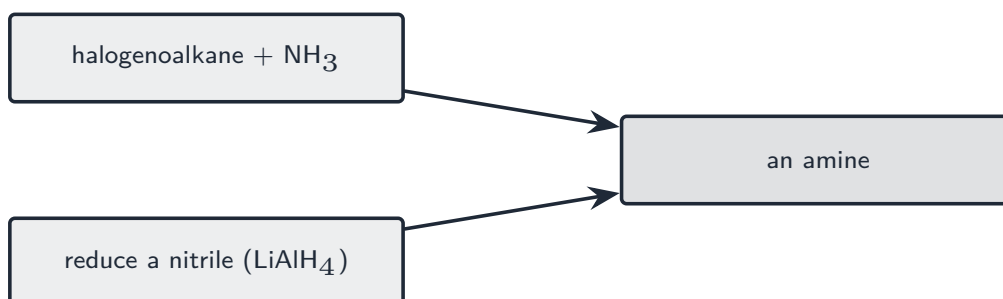
primary ($-\text{NH}_2$)



secondary ($-\text{NH}-$)

A primary amine has the nitrogen joined to *one* carbon; a secondary amine has it joined to *two*.

■ 2 Making amines



- a **halogenoalkane** 卤代烷 with NH_3 , heated under pressure;
- **reduction** 还原 of a **nitrile** 腈 with LiAlH_4 or H_2/Ni .

Watch out: primary/secondary is set by how many *carbons* the nitrogen is bonded to (one or two) — the same idea as alcohols and halogenoalkanes. The nitrogen's lone pair is what makes the amine a base and a nucleophile.

Practice

Try these in order.

34.1 What group does a *primary* amine have? [1]

34.2 How many carbons is the nitrogen joined to in a *secondary* amine? [1]

34.3 What does a halogenoalkane react with to give a primary amine? [1]

34.4 What reagent *reduces* a nitrile to an amine? [1]

34.5 Which atom in an amine carries the lone pair? [1]

34.6 Challenge. A halogenoalkane is first reacted with KCN, then the nitrile is reduced to an amine. Explain at which step the carbon chain is *lengthened*. [2]
