

9 Rusting and extraction – Part 2

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)		
reactivity series	金属活动性顺序	_____	_____	_____
rusts	生锈	_____	_____	_____
extract	提取	_____	_____	_____
ores	矿石	_____	_____	_____
Rusting	生锈	_____	_____	_____
oxygen	氧气	_____	_____	_____
barrier methods	隔离法	_____	_____	_____
galvanising	镀锌	_____	_____	_____
sacrificial protection	牺牲保护	_____	_____	_____
blast furnace	高炉	_____	_____	_____
electrolysis	电解	_____	_____	_____

Recall

From Part 1 you know the **reactivity series** 金属活动性顺序. It explains why iron **rusts** 生锈 and how we **extract** 提取 metals from their **ores** 矿石.

- Rusting is the corrosion of iron.
- A metal's place in the series decides how it is extracted.

Nothing here is hard —it just applies the order.

New ideas

Read these first, then do the Practice.

■ 1 Rusting

Rusting 生锈 is the corrosion of iron. It needs **two** things: **oxygen** 氧气 (from the air) **and** water.



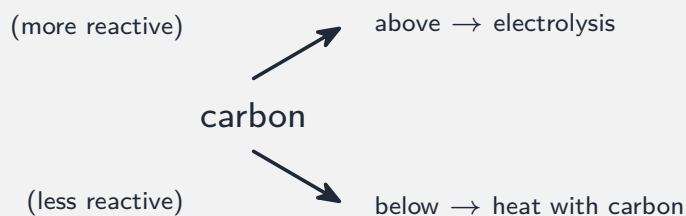
Stopping rust:

- **barrier methods** 隔离法—paint, oil/grease or plastic keep out air and water.
- **galvanising** 镀锌—coat with **zinc**; the zinc also gives **sacrificial protection** 牺牲保护 (being more reactive, it corrodes instead of the iron).

■ 2 Extracting metals

How a metal is taken from its ore depends on its reactivity:

- metals **below carbon** in the series → heat the ore **with carbon** (carbon removes the oxygen). Iron is made this way in a **blast furnace** 高炉.
- metals **above carbon** are too reactive → extracted by **electrolysis** 电解. Aluminium is made this way.



Watch out: rusting needs **both** oxygen **and** water —remove either and iron will not rust. A metal **below** carbon is extracted by heating its ore *with carbon*; one **above** carbon is too reactive and needs **electrolysis**.

Practice

Try these in order.

9.1 What two substances are needed for iron to rust? [2]

9.2 Name the rust formed (its chemical name). [1]

9.3 Galvanising protects iron in two ways. State them. [2]

9.4 Why does the more reactive zinc protect the iron, even if the surface is scratched? [2]

9.5 How is (a) iron, (b) aluminium extracted from its ore? [2]

9.6 Challenge. Aluminium is above carbon in the reactivity series, but iron is below it. Explain why aluminium must be extracted by electrolysis while iron can be extracted with carbon. [3]