

9 Metals and alloys – 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)		
Metals	金属	_____	_____	_____
non-metals	非金属	_____	_____	_____
alloy	合金	_____	_____	_____
malleable	可锻	_____	_____	_____
ductile	可延	_____	_____	_____
brittle	易碎	_____	_____	_____
mixture	混合物	_____	_____	_____
brass	黄铜	_____	_____	_____
steel	钢	_____	_____	_____
layers	层	_____	_____	_____
reactivity series	金属活动性顺序	_____	_____	_____

Recall

Metals 金属 behave very differently from **non-metals** 非金属, and we can order them by how reactive they are.

- Metals conduct heat and electricity and can be shaped.
- An **alloy** 合金 is a metal mixed with other elements.

Nothing here is hard — it just organises the properties.

New ideas

Read these first, then do the Practice.

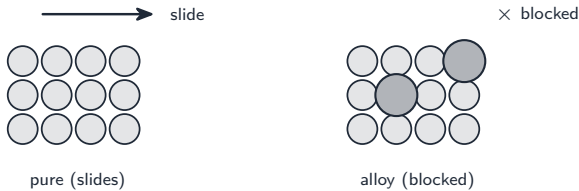
■ 1 Metals vs non-metals

Property	Metals	Non-metals
conducting heat and electricity	good	poor
malleable 可锻 / ductile 可延	yes	brittle 易碎 (snap)
melting point	usually high	usually low

■ 2 Alloys

An **alloy** 合金 is a **mixture** 混合物 of a metal with other elements (e.g. **brass** 黄铜 = copper + zinc; **steel** 钢 = iron + carbon).

Alloys are **harder** than pure metals: in a pure metal the same-size atoms let the **layers** 层 slide, but in an alloy the different-sized atoms **block** the sliding.



■ 3 The reactivity series

The **reactivity series** 金属活动性顺序 lists metals from most to least reactive (carbon and hydrogen are included for comparison):

	K	most reactive
	Na	
	Ca	
	Mg	
	Al	
less reactive	C (carbon)	
	Zn	
	Fe	
	H (hydrogen)	
	Cu	
	Ag	
	Au	least reactive

A more reactive metal **displaces** a less reactive one from a solution of its ions.

Watch out: an alloy is **harder** than the pure metal because its different-sized atoms **block the layers from sliding** — pure metals are softer, not harder. A more reactive metal **displaces** a less reactive one from a solution of its ions.

Practice

Try these in order.

9.1 State two physical properties of metals. [2]

9.2 What is an *alloy*? Give one example. [2]

9.3 Explain why an alloy is harder than the pure metal. [2]

9.4 In the reactivity series, which is more reactive — magnesium or copper? [1]

9.5 Zinc is more reactive than copper. What will zinc do to copper(II) sulfate solution? [1]

9.6 **Challenge.** Iron is more reactive than copper but less reactive than magnesium. Predict what happens when (a) magnesium is added to iron(II) sulfate solution, (b) copper is added to iron(II) sulfate solution. [2]
