

9 Periodicity (Period 3) – 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)
Periodic Table	元素周期表	_____
Periodicity	周期性	_____
atomic radius	原子半径	_____
nuclear charge	核电荷	_____
shielding	屏蔽	_____
giant metallic	金属晶体	_____
giant covalent	原子晶体	_____
simple molecular	分子晶体	_____
melting point	熔点	_____

Recall

At IGCSE you used the **Periodic Table** 元素周期表. Now we look closely at one row — **Period 3** (Na to Ar) — and see its properties change in a regular pattern.

- **Periodicity** 周期性 means properties repeat across each period.
- The pattern follows from the structure and bonding of each element.

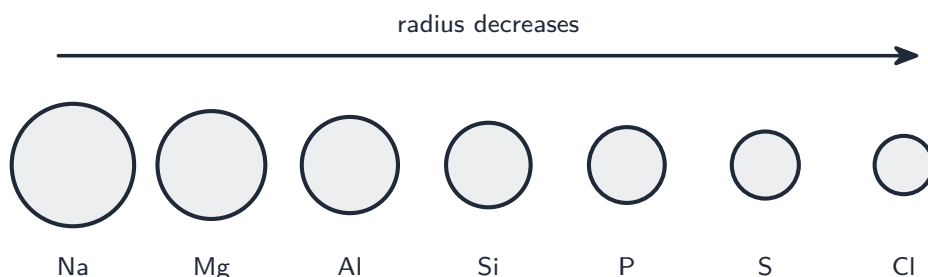
Nothing here is harder than IGCSE — it just lines up one row carefully.

New ideas

Read these first, then do the Practice.

■ 1 Atomic radius

Across Period 3 the **atomic radius** 原子半径 gets **smaller**. The **nuclear charge** 核电荷 rises (more protons), but the outer electrons go into the same shell with similar **shielding** 屏蔽, so they are pulled in tighter.

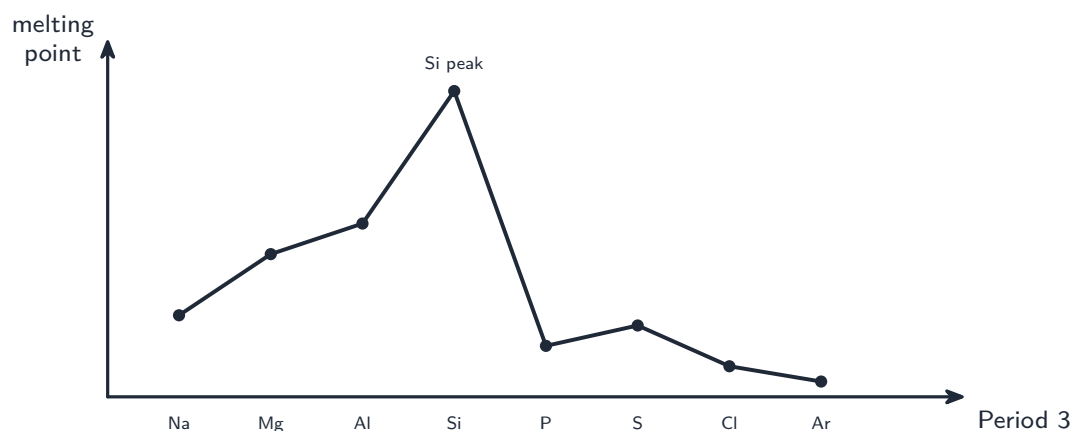


■ 2 Structure across the period

Elements	Structure	Melting point	Conducts?
Na, Mg, Al	giant metallic 金属晶体	high, rising	yes
Si	giant covalent 原子晶体	highest	no
P, S, Cl, Ar	simple molecular 分子晶体	low	no

■ 3 Melting point

The **melting point** 熔点 rises through the metals, peaks at **silicon** (strong covalent bonds to break), then drops sharply for the simple molecular elements (only weak forces break).



Watch out: across a period the atomic radius gets *smaller* (more nuclear charge,

same shell). Down a *group* it gets *bigger* (extra shells are added). Don't mix up the two trends.

Practice

Try these in order.

9.1 What is meant by *periodicity*? [1]

9.2 Describe and explain the trend in atomic radius across Period 3. [2]

9.3 Name the type of structure of (a) magnesium, (b) silicon, (c) sulfur. [3]

9.4 Silicon has the highest melting point in Period 3. Explain why. [2]

9.5 Why do sulfur and chlorine have low melting points? [2]

9.6 Challenge. Sodium has a larger atomic radius than chlorine, even though both are in Period 3. Explain why. [2]
