

2.2 Atomic structure and the Periodic Table

Name: _____ Class: _____ Date: _____

Total: 9 marks

KEY WORDS electrons 电子 • neutrons 中子 • protons 质子 • electronic configuration 电子排布 • charge 电荷

Objective

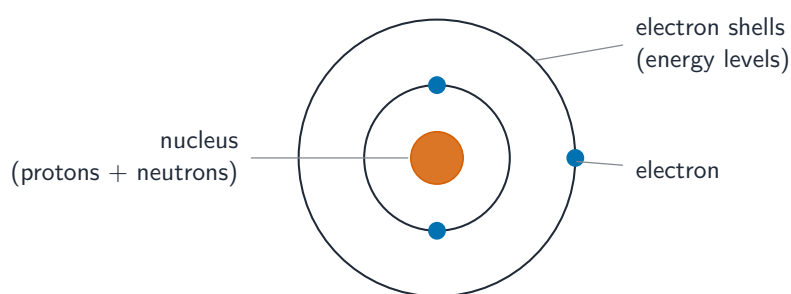
Build the skills to answer exam questions on **atomic structure and the Periodic Table** 原子结构与周期表 — sub-atomic particles, **proton/mass number** 质子数/质量数, and **electronic configuration** 电子排布.

You must be able to:

- give the relative mass and charge of protons, neutrons, electrons
- find protons, neutrons and electrons from proton and mass numbers
- write electronic configurations and link them to Group and Period

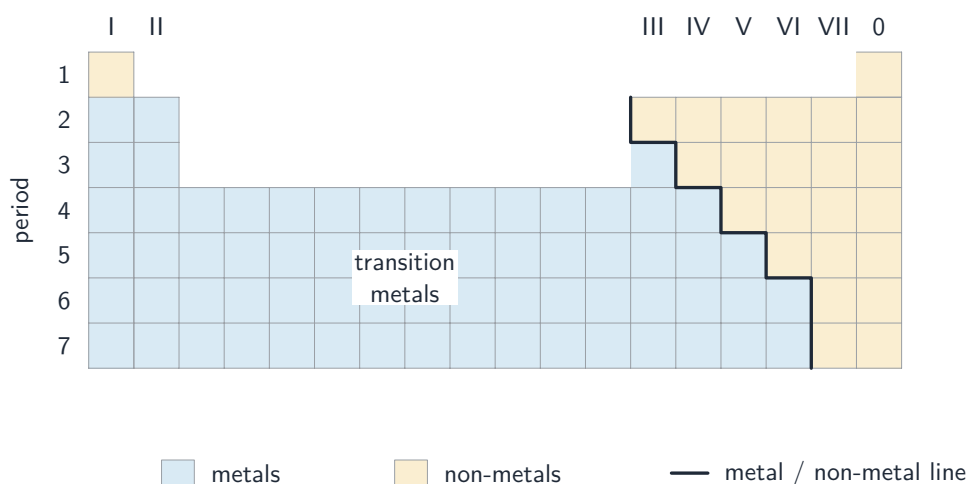
1 Worked examples

■ Configuration and the Periodic Table



lithium, Li: 3 protons, 4 neutrons
electron configuration 2,1

Electrons fill shells from the inside: 2, then 8, then 8 (first 20 elements)



Electron arrangement explains an element place in the Periodic Table

- **proton +1, neutron 0, electron -1**; neutrons = mass number – proton number.
- **Group** = outer-shell electrons; **Period** = number of shells.
- e.g. sodium 2, 8, 1 → Group I, Period 3.

2 Practice

2.1 State the relative charge of a neutron. [1]

2.2 Write the electronic configuration of calcium (proton number 20). [1]

3 Exam-style questions

3.1 An atom has the configuration 2, 8, 7. It is in: [1]

- **A** Group II, Period 7
 - **B** Group VII, Period 3
 - **C** Group VII, Period 2
 - **D** Group III, Period 7
-

3.2 An atom of aluminium has proton number 13 and mass number 27.

(a) State the number of protons, neutrons and electrons. [3]

(b) Write its electronic configuration. [1]

3.3 Explain why an atom has no overall electric charge. [2]

Solutions

2.1 0 (neutral).

2.2 2, 8, 8, 2.

3.1 B. Outer shell 7 $\rightarrow$ Group VII; three shells $\rightarrow$ Period 3.

3.2 (a) protons = 13; neutrons = $27 - 13 = 14$; electrons = 13.

(b) 2, 8, 3.

3.3 it has equal numbers of protons (+1) and electrons (−1); so the positive and negative charges cancel.