

5 The atom – 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)		
atoms	原子	_____	_____	_____
nucleus	原子核	_____	_____	_____
electrons	电子	_____	_____	_____
neutral	中性	_____	_____	_____
protons	质子	_____	_____	_____
neutrons	中子	_____	_____	_____
orbits	轨道	_____	_____	_____
mass	质量	_____	_____	_____
proton number	质子数	_____	_____	_____
nucleon number	核子数	_____	_____	_____
ion	离子	_____	_____	_____
Isotopes	同位素	_____	_____	_____

Recall

Everything is made of **atoms** 原子. The IGCSE course looks inside the atom — at its tiny **nucleus** 原子核 and the **electrons** 电子 around it.

- The nucleus is positive; the electrons are negative.
- The whole atom is **neutral** 中性 (the charges balance).

Nothing here is hard — it just names the parts.

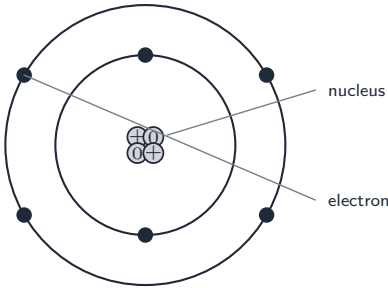
New ideas

Read these first, then do the Practice.

■ 1 Inside the atom

- the tiny central **nucleus** 原子核 holds **protons** 质子 (charge +1) and **neutrons** 中子 (charge 0).
- **electrons** 电子 (charge -1) move around it in **orbits** 轨道.

Almost all the **mass** 质量 is in the nucleus, but the atom is mostly empty space.



■ 2 Proton number and nucleon number

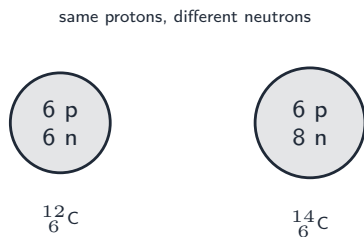
- the **proton number** 质子数 (Z) is the number of protons.
- the **nucleon number** 核子数 (A) is the number of protons **plus** neutrons.

So the number of neutrons is $A - Z$. We write a nucleus as ${}_Z^AX$.

An atom can gain or lose electrons to become an **ion** 离子 (lose $\rightarrow$ positive, gain $\rightarrow$ negative).

■ 3 Isotopes

Isotopes 同位素 are atoms of the **same** element (same Z) with **different** numbers of neutrons (different A).



Watch out: the proton number Z counts only protons; the nucleon number A counts protons **plus** neutrons — so neutrons = $A - Z$, never just A . Isotopes share Z (same element) but differ in A .

Practice

Try these in order.

5.1 Name the two particles found in the nucleus. [2]

5.2 What is the charge on (a) a proton, (b) an electron? [2]

5.3 A nucleus is written $^{197}_{79}\text{Au}$. How many (a) protons, (b) neutrons does it have? [2]

5.4 An atom loses an electron. What kind of ion does it become? [1]

5.5 What is meant by *isotopes*? [2]

5.6 **Challenge.** An atom of $^{23}_{11}\text{Na}$ loses one electron to become an ion. State the number of (a) protons, (b) neutrons and (c) electrons in this ion. [3]