

4 Titration, acids and bases, and redox – 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)		
titration	滴定	_____	_____	_____
equivalence point	等当点	_____	_____	_____
acid	酸	_____	_____	_____
base	碱	_____	_____	_____
redox	氧化还原	_____	_____	_____
oxidation	氧化	_____	_____	_____
reduction	还原	_____	_____	_____

Recall

You have met acids and bases before, and maybe done a titration:

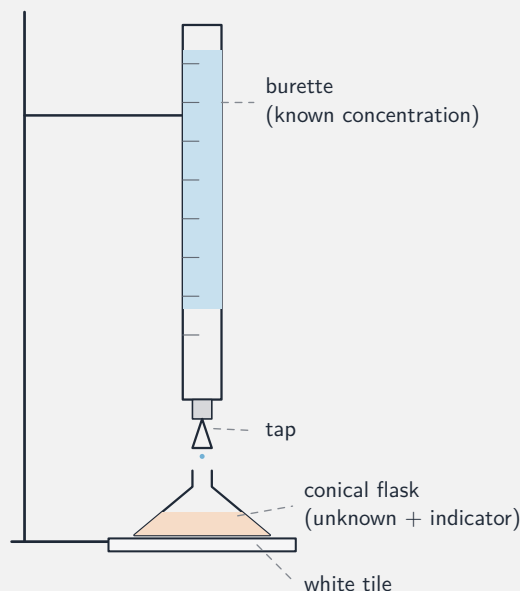
- Acids taste sour and turn litmus red; bases (alkalis) feel soapy and turn it blue.
- An acid and a base react to make a salt and water.
- Some reactions transfer electrons –like a metal reacting with oxygen.

This sheet lines up three important reaction types. Each idea has a worked example.

New ideas

■

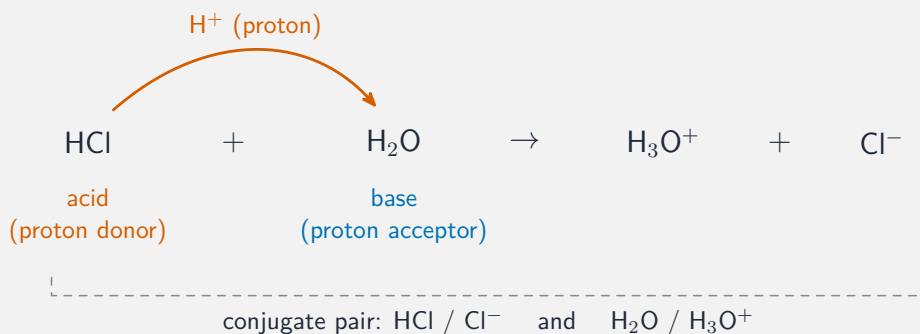
A **titration** 滴定 finds an unknown concentration by reacting it with a solution of known concentration until they exactly match –the **equivalence point** 等当点.



Worked example. 25.0 mL of acid is neutralized by 30.0 mL of 0.100 M NaOH (a 1 : 1 reaction). Moles of NaOH = $0.0300 \times 0.100 = 3.00 \times 10^{-3}$, so moles of acid are the same, giving $[\text{acid}] = \frac{3.00 \times 10^{-3}}{0.0250} = 0.120 \text{ M}$.

■ 2 Acid–base reactions

An **acid** 酸 gives away a proton (H^+); a **base** 碱 accepts one. They react to make water and a salt:

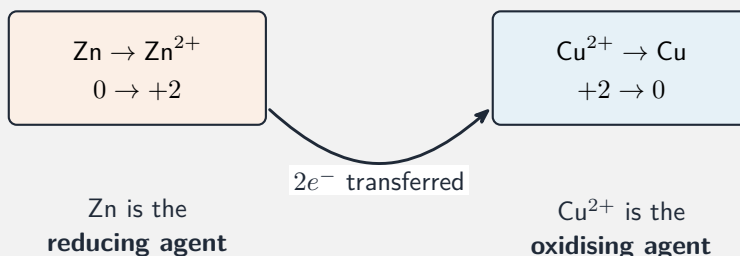


■ 3 Redox reactions

In a **redox** 氧化还原 reaction, electrons transfer between substances:

oxidation: loses $2e^-$
(oxidation number $\uparrow$)

reduction: gains $2e^-$
(oxidation number $\downarrow$)



- **oxidation** 氧化 is **loss** of electrons,
- **reduction** 还原 is **gain** of electrons.

Remember "OIL RIG": Oxidation Is Loss, Reduction Is Gain.

Worked example. When magnesium burns, $\text{Mg} \rightarrow \text{Mg}^{2+} + 2e^-$: it **loses** electrons, so magnesium is oxidized.

Watch out: every oxidation is paired with a reduction –the electrons one substance loses are exactly the electrons another gains. You cannot have one without the other.

Practice

Try these in order. The methods are all above.

2.1 State what happens at the equivalence point of a titration. [1]

2.2 20.0 mL of acid is neutralized by 25.0 mL of 0.100 M NaOH (a 1 : 1 reaction). Find the acid's concentration. [3]

2.3 Write the ionic equation for an acid reacting with a base to form water. [1]

2.4 State whether oxidation is the loss or gain of electrons, and do the same for reduc-

tion.

[2]

2.5 In the reaction $\text{Zn} \rightarrow \text{Zn}^{2+} + 2e^{-}$, state whether zinc is oxidized or reduced, and why.

[2]
