

9 Periodicity (Period 3) – 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)
oxides	氧化物	_____
chlorides	氯化物	_____
basic	碱性	_____
amphoteric	两性	_____
acidic	酸性	_____
hydrolyse	水解	_____

Recall

From Part 1 you know Period 3 goes from metals (left) to non-metals (right). Here we see how that changes the **oxides** 氧化物 and **chlorides** 氯化物.

- Metal oxides are **basic**; non-metal oxides are **acidic**.
- One oxide in the middle is special: it reacts both ways.

New ideas

Read these first, then do the Practice.

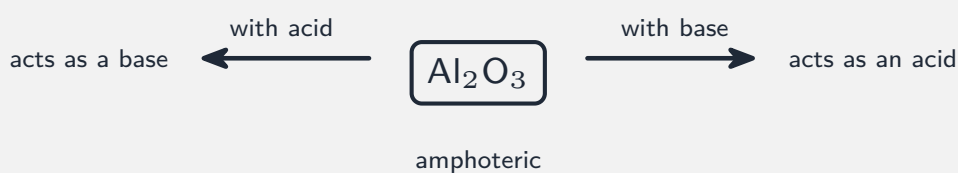
■ 1 Acid–base nature of the oxides

Across Period 3 the oxides change from **basic** to **acidic**:

- **metal oxides** (Na O, MgO) are **basic** 碱性.
- **Al O** is **amphoteric** 两性—it reacts with **both** acids and bases.
- **non-metal oxides** (P O , SO) are **acidic** 酸性.

metal oxides			non-metal oxides	
basic		amph.	acidic	
Na ₂ O	MgO	Al ₂ O ₃	P ₄ O ₁₀	SO ₃

■ 2 Aluminium oxide is amphoteric



It behaves as a base with acids, and as an acid with bases —that is what **amphoteric** means.

■ 3 Chlorides with water

- **ionic chlorides** (NaCl, MgCl) simply **dissolve**, giving a near-neutral solution.
- **covalent chlorides** (SiCl , PCl) **hydrolyse** 水解 (react with water), giving an **acidic** solution and **HCl** fumes.

Watch out: the oxides change from basic (metals) through amphoteric (Al O) to acidic (non-metals) —the trend follows the metal-to-non-metal change across the period.

Practice

Try these in order.

9.1 State whether each oxide is basic or acidic: (a) Na O, (b) SO . [2]

9.2 What does *amphoteric* mean? [1]

9.3 Which Period 3 oxide is amphoteric? [1]

9.4 Sodium chloride dissolves in water to a neutral solution, but phosphorus(V) chloride reacts with water. Explain this difference. [2]

9.5 Name the gas given off (as fumes) when a covalent chloride is added to water. [1]

9.6 Challenge. Predict which would raise the pH of water —magnesium oxide (MgO) or sulfur trioxide (SO_3) —and explain. [2]