

28 Transition elements – 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)
transition element	过渡元素	_____
oxidation states	氧化态	_____
catalysts	催化剂	_____

Recall

A **transition element** 过渡元素 is a d-block element that forms at least one stable ion with an incomplete d sub-shell.

New ideas

Read these first, then do the Practice.

■ 1 Four key properties

variable oxidation states

act as catalysts

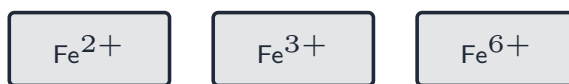
form complex ions

coloured compounds

Transition elements show variable **oxidation states** 氧化态, act as **catalysts** 催化剂, form complex ions, and make coloured compounds.

■ 2 Variable oxidation states

iron, for example:



3d and 4s are close in energy, so several states form

The 3d and 4s sub-shells are close in energy, so similar small amounts of energy remove different numbers of electrons — giving several oxidation states.

Watch out: a transition element forms at least one ion with an *incomplete* d sub-shell. That is why scandium (only Sc^{3+} , d^0) and zinc (only Zn^{2+} , d^{10}) are often *not* counted as typical transition metals.

Practice

Try these in order.

28.1 What is a *transition element*? [1]

28.2 Name two key properties of transition elements. [2]

28.3 Give two oxidation states of iron. [1]

28.4 Why do transition metals show *variable oxidation states*? [1]

28.5 What colour range do their compounds tend to be? [1]

28.6 Challenge. Zinc is in the d-block, but is often *not* classed as a typical transition element. Explain why, given that its only ion is Zn^{2+} (d^{10}). [2]
