Correcting configurations

Learning objectives

1 Give the electron configurations of atoms and ions using subshells and orbitals including Hund's rules.

2 Use different representations of electron configurations including noble gas cores and 'electrons in boxes'.

3 Relate the subshell containing the outermost electrons to an element's position in the periodic table.

4 Explain electron configurations in terms of ionisation energy trends.

Introduction

We understand chemical reactions as a rearrangement of electrons. It is crucial that we have a clear concept of the electron arrangements in atoms and ions to understand why and how they form bonds.

Question corrections

The following questions on electron configuration have already been answered. Peer review each of the student answers, give an improved answer and explain why the original answer is wrong.

1. Give the electron configuration of sodium, giving the number of electrons in each subshell.

   Student answer: **2,8,1**

Peer review: _____

2. Give the electron configuration of sulfur, giving the number of electrons in each subshell.

   Student answer: **$1s^2$ $2s^2$ $2p^6$ $3s^2$ $3d^4$**

Peer review: _____

3. Give the electron configuration of calcium, giving the number of electrons in each subshell and using a noble gas core for full inner shells.

Student answer: **[Ne] $4s^2$**

Peer review: _____

4. Give the electron configuration of the vanadium(II) ion, V^{2+}, giving the number of electrons in each subshell and using a noble gas core for full inner shells.

Student answer: **[Ar] $4s^2$ $3d^1$**

Peer review: _____

5. Give the electrons in boxes configuration of carbon.

Student answer:

Peer review:

6. Explain why the first ionisation energy increases from H to He.

Student answer: **The ionisation energy increases because there is an extra electron and the outer shell is now full, which makes it more stable.**

Peer review: _____

7. Explain why the first ionisation energy decreases as you go down the group from Li to Na.

Student answer: **The electron removed is from a different subshell.**

Peer review: _____

8. Explain why the first ionisation energy decreases as you go from Be to B.

Student answer: **The electron in Be is spin-paired but the electron in B is unpaired so easier to remove.**

Peer review: _____

9. Explain why the first ionisation energy decreases as you go from N to O.

Student answer: **The electron is removed from a higher energy orbital in oxygen.**

Peer review: _____