



Achievers Dream

We Believe You Can Fly

Explanations for Atomic Structure



The Chemistry Specialist

NOTES:

Compare the IE for
2 atoms or 2 ions

1

General trend for the
same quantum shell

Example:

Lowest 1st IE

Na

ns^1

vs

Highest 1st IE

Ar

ns^2np^6

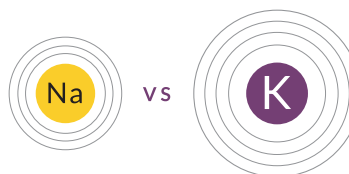
- ⚙ Across the period, nuclear charge increases
- ⚙ Shielding effect remains relatively constant
- ⚙ Effective nuclear charge increases



2

Trend **down the group**
where quantum shells
increases

Example:

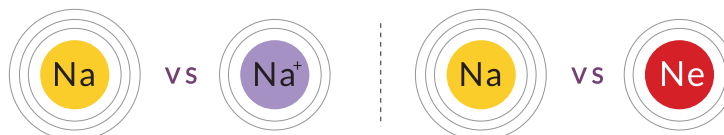


- ⚙ Down the group, number of inner quantum shells increases
- ⚙ Valence electron is further away from the nucleus
- ⚙ Effective nuclear charge decreases

3

Increase in quantum shell
(explain large difference
in energy)

Example:



- ⚙ Na⁺ has **one less quantum shell**
- ⚙ Outermost electron is removed from an inner quantum shell which is **closer to and less shielded from the nucleus**

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Anomaly:
Grp 2 to Grp 13

Example:



- ⚙ Outermost electron in B is found in p orbital
 - ⚙ **p orbitals are higher in energy than s orbitals**
- Outermost electron in B is found

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Anomaly:
Grp 15 to Grp 16

Example:



- ⚙ Electron removed from O is from a p orbital that contains 2 electrons
- ⚙ **Experience inter-electronic repulsion**