Announcements

Monday, March 30, 2009

MasteringChemistry assignments:

- Ch 8 due today
- Ch 9 due this Wed, Apr 1

Exam 2 covering the end of Ch 5 through Ch 9 is this Wed, April 1. The study guide is on the webpage

QA sessions in lab this week - Tues 1pm, Wed 8am

Mon 3pm lab today: Exp 9 (make-up from Feb 23)

Electron configurations and the rest of the periodic table

Available subshells to fill:

n=1 1s
n=2 2s 2p
n=3 3s 3p 3d
n=4 4s 4p 4d 4f
n=5 5s 5p 5d 5f
n=6 6s 6p 6d
n=7 7s 7p

1st available d subshell

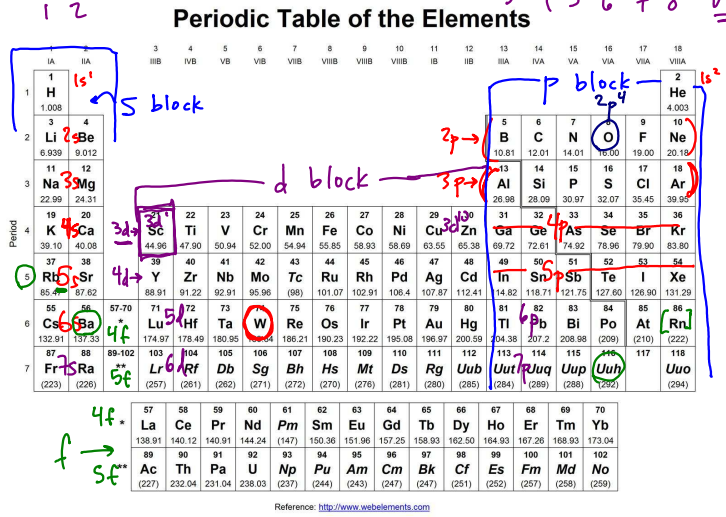
Subshell	Max # e⁻
s	2
p	6
d	10
f	14

Na: $1s^2 2s^2 2p^6 3s^1$ Ar: $1s^2 2s^2 2p^6 3s^2 3p^6$

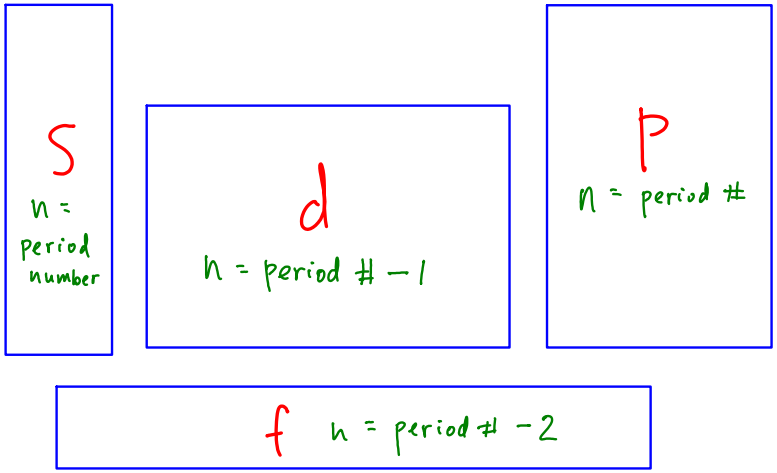
Ca: $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2$ Sc: $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^1$

Ba: $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^6 5s^2 4d^{10} 5p^6 6s^2$

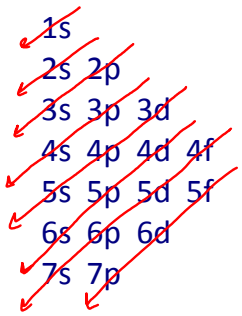
1 2 3 4 5 6 7 8 v.e.



Sections of the periodic table



Filling order (to check work only!)



W:

[Xe]

$W: 1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^6 5s^2 4d^{10} 5p^6 6s^2 4f^{14} 5d^4$

Abbreviated electron configurations, valence electrons

Noble gases all have **full subshells**

Abbreviated electron configuration starts with the nearest smaller noble gas in brackets, then continues

2 valence electrons

W: $[Xe]\,6s^2\,4f^{14}\,5d^4$ n = 6 : valence shell

Uuh: $[Rn]\,7s^2\,5f^{14}\,6d^{10}\,7p^4$ n = 7 : valence shell

6 valence electrons

Valence electrons: electrons in the outermost **shell** (not subshell)

highest "n"

n

4s subshell is in the *n* = 4 shell

5p subshell is in the *n* = 5 shell

The largest *n* number in an electron configuration is the **valence shell**.

circle the valence electrons

Bi: $[Xe]\,6s^2\,4f^{14}\,5d^{10}\,6p^3$ n = 6 : valence shell

5 valence e⁻ : $6s^2 6p^3$

Br:

Orbital diagrams

Subshell	Max # e⁻	# Orbitals
s	2	1
p	6	3
d	10	5
f	14	7

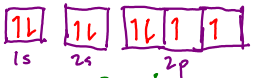
Recall, an orbital is a … volume inside of which an electron is likely to be found

If an s subshell contains a single orbital, how many orbitals are in a p subshell?

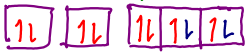
Every orbital holds a maximum of 2 electrons.

Orbital diagrams: box : an orbital

O: $1s^2\ 2s^2\ 2p^4$

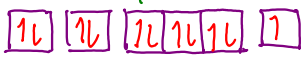


O^{2-}: $1s^2\ 2s^2\ 2p^6$ 2 − means 2 more electrons



← subshells full
stable, just like Ne

Na: $1s^2\ 2s^2\ 2p^6\ 3s^1$



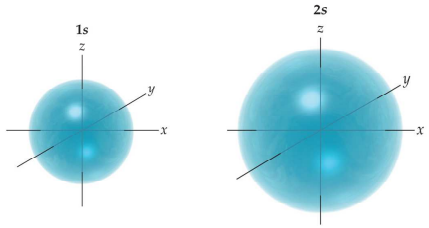
Na^+:

← stable, like Ne

What do these orbitals look like?

These orbitals are actual 3-dimensional shapes which can hold up to 2 electrons.

All **s** orbitals are spherical:



p orbitals are dumbbell-shaped: