

10/29/05

CHM 123 Lecture Notes

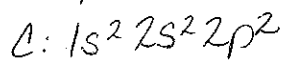
* Quiz #4 during the week of October 31st.

Electron Spin and Pauli Exclusion Principle (PEP)

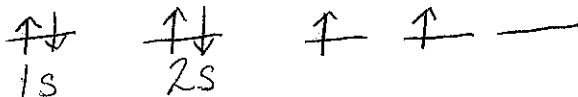
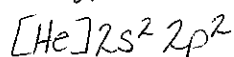
$$-m_s = \pm 1/2$$

- PEP - no 2 electrons in an atom can have the same set of four quantum numbers (n, l, m_l, m_s)
- orbital shapes (see table in text)
- quantum numbers (Table 7.3)
- electron configuration - complete description of orbitals occupied by all the electrons in an atom
- for atoms in ground state - electrons occupy energy shells, subshells, and orbitals that give the lowest value
- electron configurations of first ten elements (Table 7.5)
- degenerate - orbitals with the same energy
- Hund's Rule - electrons pair only after each orbital in a subshell is occupied by a single electron

* Example:



or



- valence electrons - chemically similar behavior occurs among elements within a group in the periodic table; electrons held in the outer shell

- core electrons - electrons held in inner filled shells

- d subshell being filled

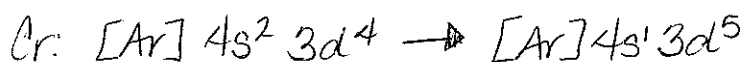
valence electrons of the s and p electrons in outermost shell
plus electrons in incompletely filled (n-1)d subshell



filled after ns orbital, but before
np orbitals

* Example:

half-filled d subshells are favoured, if possible (Hund's Rule)



* Ion Electron Configuration
(See lecture notes)

* Transition Metal Ions

- Take ~~two~~ away s orbital electrons before the d orbitals

* Magnetic Properties of Compounds

- diamagnetic - atoms and ions with all electrons filled (repelled by magnetic field)

- paramagnetic - atoms and ions with unpaired electrons (attracted by magnetic field)

* Periodic Trends: Atomic Radii

- move down periodic table $\rightarrow$ increasing n $\rightarrow$ subshell
radius increases

- atomic size (radius) increases down periodic table

- atomic radius decreases towards the right in the periodic table

* Bond length

Ex: Cl_2

