Classlecture

9/25/13

Electron Configuration and Periodic table

- Why is Sr so dangerous?
  ↳ It's Radioactive, and same group as Ca, so it would be bad for your body.

* LM17 and HW05 due Tuesday 9AM

⇒ Review Periodic table Basics and Nomenclature on fundamental section of Website.

* electron configurations ⇒ tells where are the e^-

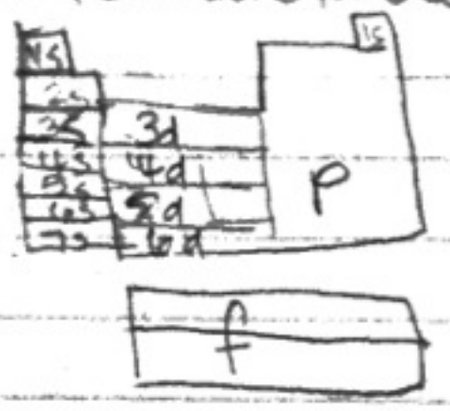
- Schrodinger Equation yield solution that provides information about: Energy of electron; Probability of finding where it is.
- Not a valid set of quantum # for wave function for an electron in a hydrogen atom.
  ⇒ $n=2, l=2, m=1$

⇒ $n = 1, 2, 3, 4, \ldots$
$l = 0, \ldots n-1$.
$m_l = -l, \ldots 0, \ldots +l$

⇒ Each orbital is designated by a set of 3 quantum #'s and fall into Shells and Subshells.
$l=0 \Rightarrow s$ $l=1 \Rightarrow p$ $l=2 \Rightarrow d$ $l=3 \Rightarrow f$.

- many electrons atoms
  ↳ Answer is same as hydrogen. Every atom looks the same, It's just the energy difference.
  → lowest solution always is; the order is always the same. difference energy and # of electrons.
  Z = nuclear charge. It makes hydrogen a hydrogen: It helps differentiate the elements. [# of Protons]
  Outer electrons are shielded from nucleus.
  ↳ loss of degeneracy in shells.
- $m_s \Rightarrow$ Spin $\Rightarrow 1/2$ or $-1/2$ ⇐ 4th quantum #.
  Pauli Exclusion: no 2 e^- in an atoms, have the

Same Quantum #'s
QM => Wavefunctions: tells us where the e^- is (orbital) paired with (ϵ) Energy of e^-
Classifys -> Quantum #'s CODE.
Multi e^- -> Order of energies is same for all elements.
↳ So you can fill in 2 e^- from low to high in each orbital
= Use Periodic table to remember energy level



2p
"Ground state"

Electron Configuration
$1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^1$
+1

- low energy => more stable
- high energy => less stability
- Big impacts for chemistry because it all depends on electrons
- elements w/ same electrons have similar chemistry.

Aufbau Principle: (building up)
Ne => $1s^2\ 2s^2\ 2p^6$ => stable gas.
Na => [Ne] $3s^1$ not so stable metal $Z = 11$ -> # protons
Shielding and "effective nuclear charge"

Ne $1s^2\ 2s^2\ 2p^6$
10 e^-
+10

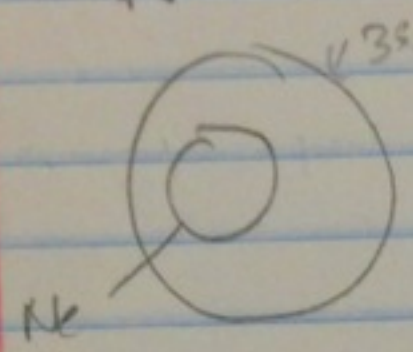
Na $1s^2\ 2s^2\ 2p^6\ 3s^1$
10 e^-
1 e^-
+11
t_{3s}

$Z_{effective} \approx +1$

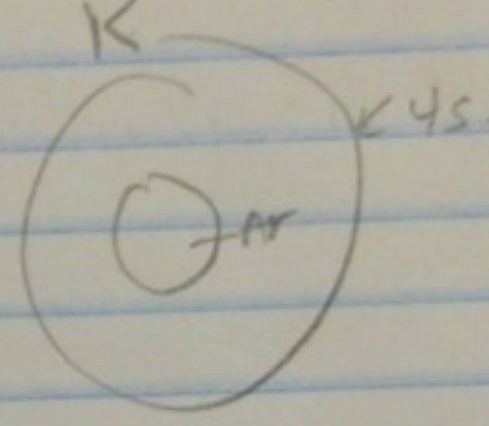
As n increases distance from the nucleus increases.
Na => more like +1 than Ne. => Because of the last electron alone.
Core e- shielding (shields) valence electrons
* Going from left to right on a period; I add e^- & more shielding add more protons -- bigger Z: Which has bigger effect?
=> Adding more protons until you fill up shell.

- Left to Right Zeff is Increasing.
- Ionization energy increases; Size decreases
- Shielding and Eff nuclear charge

Na



K



As you go down the periodic table; its easier to rip off.