Atomic Structure Review:

3 Parts

p ⇒ never change

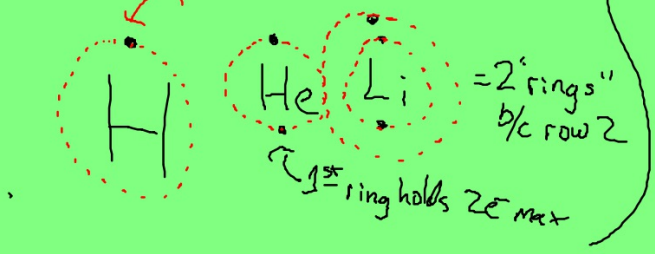
n ⇒ isotopes

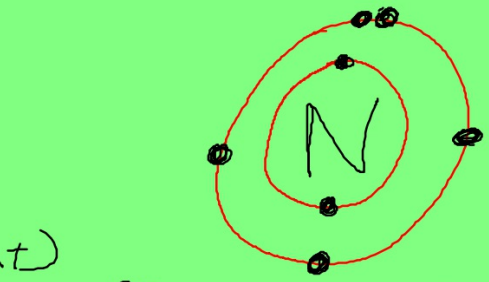
e⁻ ⇒ change easily to ge Energy (heat & light)

How many e⁻ are in H?

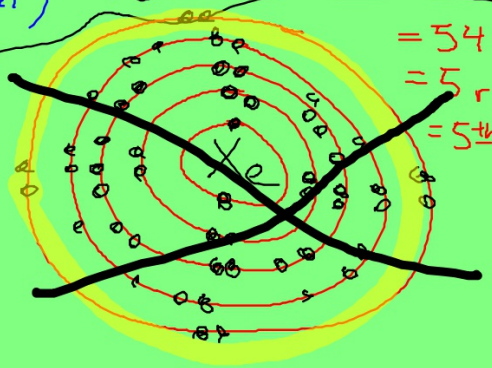
1 e⁻ b/c 1 p b/c A# = 1 (neutral)

⇒





ring 2 hold max of 8 dots/e⁻



=54 e⁻
=5 ring
=5th ring has 8e⁻

THE ELECTRON

-the more e- = the greater the (-) charge = more Energy

-found in e- cloud; spin around nucleus (positive core attracts negative cloud)

-move around in orbital -> set path & set # of e- on each path

~~-movement creates (electricity) ENERGY~~

Electron Orientation in an Atom

Quantum Mechanical Model:

-atom has no definite shape

-increase in # of e- = increase in size = increase in ENERGY

Orbital Notation

-states location of e- around the nucleus

-every atom has a different # of e-

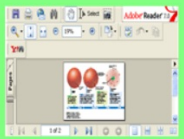
HISTORY~ 4 Models of Atoms

1) Thomson: ball of (+) charges in center with e- outside
--NOT # of p & n, or arrangements in atom

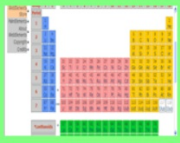
2) Rutherford: showed nucleus had most of atom's mass
--NOT nucleus contains p & n, or (+) attract (-)

3) Bohr: e- travel around nucleus in a definite orbital
-e- do not fall into the nucleus
*fixed paths are named Energy Levels
->increase level = increase E
->to inc level, you move to the next level = Quantum
->all e- not equally spaced apart or spaced from nucleus …
think escalator

4) **Quantum Mechanical Model**: *includes models 1, 2, 3*
-math equation to tell the location & E of e-
-estimates probability of e- in certain position
-portrays a "fuzzy cloud" model (when moving)
-> most dense where e- most likely found
***denser around smaller atoms
-specific levels tell location of e-
=> inc level = inc E



Lewis Dot refresher
-> for Group A / Representative Elements *(the peaks)*



Levels & Orientation

E levels (n) = 1, 2, 3, 4, 5, 6, 7 (rows on PT)

->sublevels = s, p, d, f (specific location & # of e- on PT)

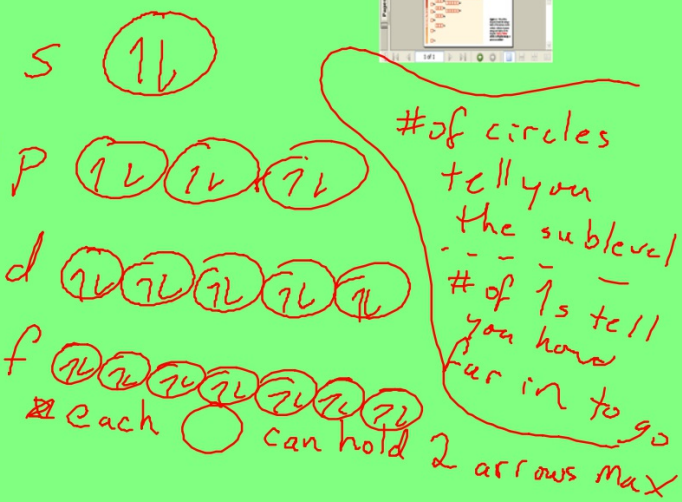
E Levels	Sublevels
1	s = hold 2 e^- max
2 s	p = hold 6 e^- max
3 s p	d = hold 10 e^- max
4 s p d	f = holds 14 e^- max

add new sublevel

add new sublevel

add new sublevel

Drawing it

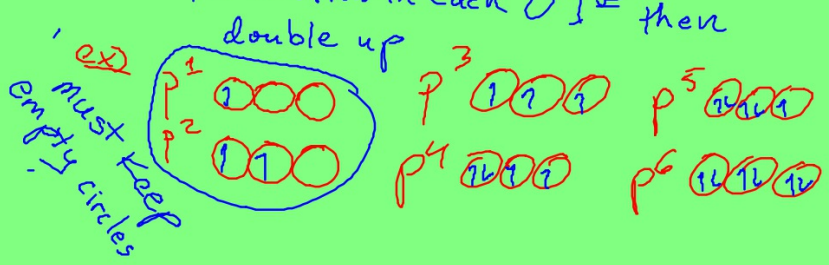


*when you inc in E level, you add 1 more sublevel

*E levels 5, 6, 7 can have all spdf sublevels

3 Rules to using e- configuration / orbital notation:

1) Aufbau Principle
-e- enter at lowest E level first
* always start with H
2) Pauli Exclusion Principle
-an atomic orbital may have at most 2 e-
* each circle holds 2 e⁻
3) Hund's Rule
-when e- occupy orbitals of equal E, 1e- enters each orbital
until all orbitals contain 1e-
* put 1 arrow in each O] then double up



PRACTICE PRACTICE PRACTICE!!!

* f & d region
- always write in order of increasing Atomic Number

If you stop in $4f^{\#}$ or $5f^{\#}$ region,
you write: ... $5d^1\ 4f^{\#}$
(b/c 57 58-71)
... $6d^1\ 5f^{\#}$
(b/c 89 90-103)

If you stop in $5d^{2-10}$ or $6d^{2-10}$,
you write: ... $4f^{14}\ 5d^{2-10}$
(b/c 71 72-80)
... $5f^{14}\ 6d^{2-10}$
(b/c 103 104-112)

PRACTICE PRACTICE PRACTICE!!!

Exceptions (to Aufbau Rule)

Cu, Cr, and bunch others

DO BY NORMAL RULES!

$_{8}O^{0} = 1s^2\ 2s^2\ 2p^4$ ⟸ neutral

$O^{+1} = 1s^2\ 2s^2\ 2p^3$ positive charge means we subtract e^-

$O^{-2} = 1s^2\ 2s^2\ 2p^6$ negative charge means we add e^-