

Bohr-Rutherford Diagrams

The Bohr Postulates

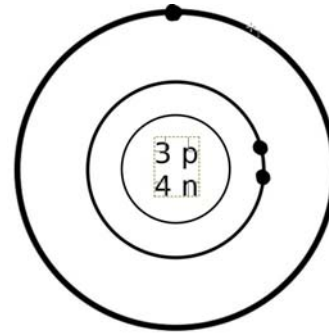
- e's are placed in energy levels (orbits) about the nucleus
- the further away from the nucleus, the higher the energy of the orbit
- energy levels get closer together the greater the distance from nucleus
- e's must occupy an energy level, they are never found between levels
- e's are positioned in the lowest possible energy level which can accommodate them
- e's "jump" to a higher level when they absorb energy
- e's release energy when they "jump" back to a lower level
- each line in a line spectrum corresponds to a different e transition in an atom
- each energy level has a fixed maximum number of e's it can hold, defined by the equation $2n^2$

Energy Level (n)	Max. # of e's ($2n^2$)
1	2
2	8
3	18
4	32
.	.
.	.
infinity	

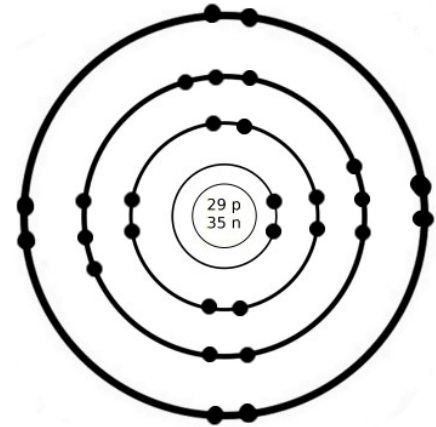
* For $n = 3$ or higher (beyond the second level or orbit), the energy level cannot accommodate more than eight e's when it is the outermost orbital. For example, the 4th level must have eight e's before the 3rd level can have more than eight.

Bohr-Rutherford Diagram

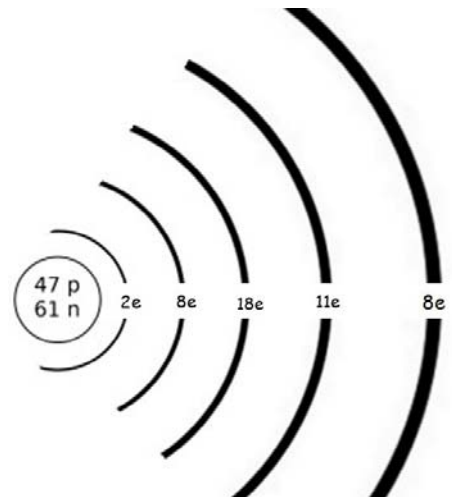
e.g. lithium - 7
atomic # = # p = # e = 3
n = 4



e.g. copper - 64
atomic # = # p = # e = 29
n = 35



e.g. silver-108
atomic # = # p = # e = 47
n = 61



Periodic Electronic Structure

- the electronic structure (ie. # and position of e's) determines the characteristics of elements

valence e's - the e's positioned in the outermost energy level

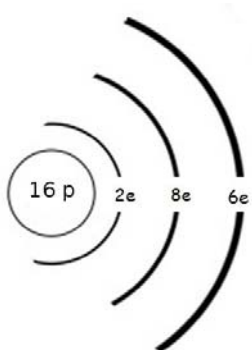
- determine the physical and chemical properties of the element

Two ways to represent the e's in an atom:

- 1) Bohr diagrams
- 2) Electron configuration
- 3) Lewis diagrams (Electron Dot diagrams)

e.g. show the Bohr diagram and Lewis diagram for sulphur

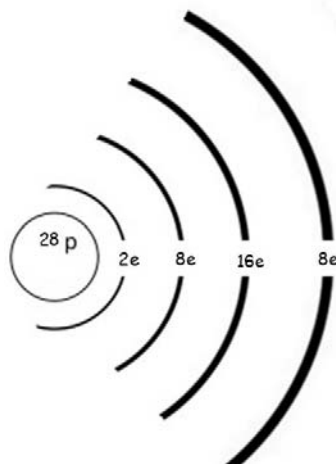
Bohr Diagram



Lewis Diagram

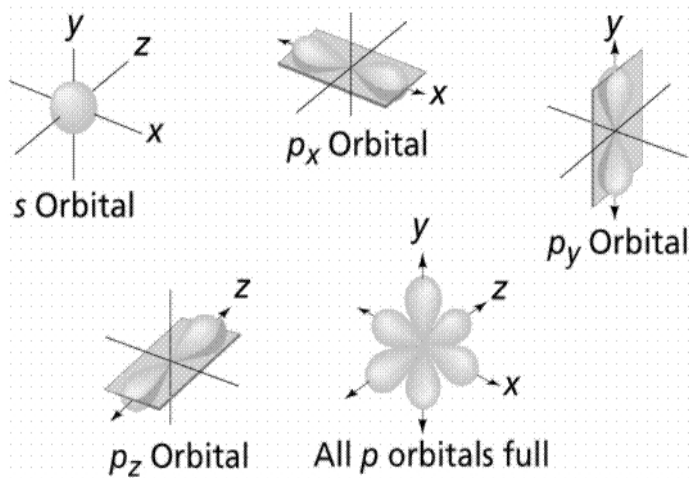


e.g. nickel
atomic # = # p = # e = 28

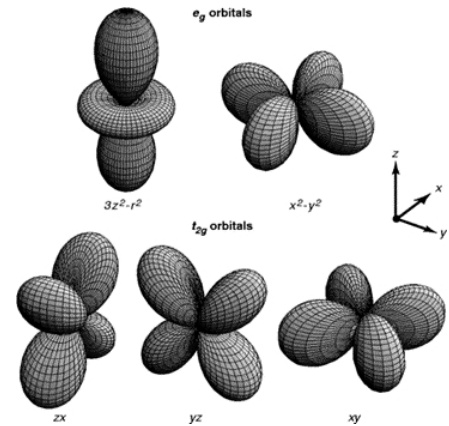


The Quantum Model

s and p orbitals



d orbitals



- orbitals are areas around the nucleus in which electrons of a particular energy are likely to be found
- s orbitals are spherical
- p orbitals are dumbbell shaped
- d orbitals are four lobed
- p found higher s, d found higher than p & s, f found higher than d, p & s
- electrons in third level have more energy than those in 2nd and 2nd more than 1st
 - s of 4th level have less energy than d of 3rd level