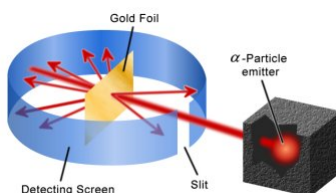
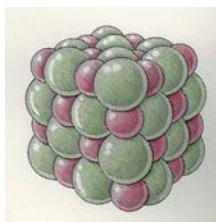
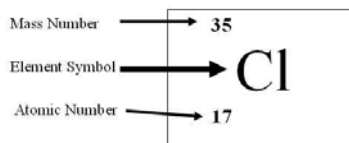
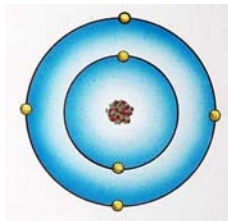


Atomic Structure



Chapters 3 & 4

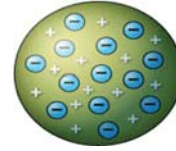
1

Atomic Theory

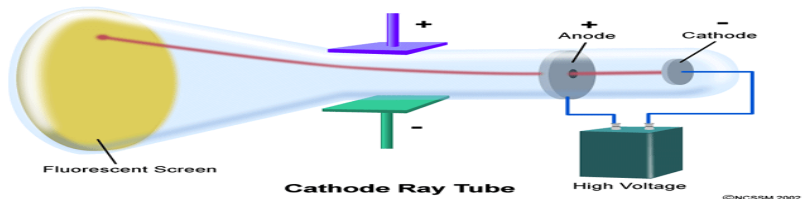
- Dalton (1800's)
 - All matter is composed of small particles called _____
 - Atoms of a given element are identical in _____, _____ and other _____ properties
 - Atoms can not be created, destroyed or subdivided (later proven _____)
 - Atoms of different elements _____ in simple whole-number ratios to form _____
 - (ex. H₂O, CO₂)
 - Atoms in compounds can be combined, separated, or re-arranged

2

Atomic Theory



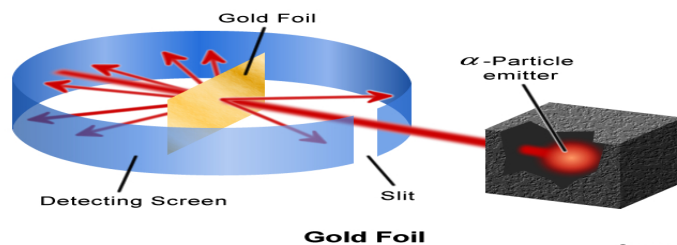
- J.J Thomson (late 1800's)
 - Determined that the atom had _____ charged particles (called _____) within the _____ structure
 - _____ model of the atom
 - electrons distributed _____ throughout the _____ of the atom
 - Experimented with Cathode Ray Tube



3

Atomic Theory

- Ernest Rutherford (early 1900's)
 - _____ Experiment



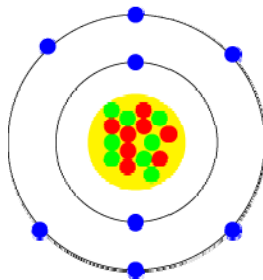
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- Most of the volume on the atom was _____
- Most of the mass of the atom is concentrated in the _____ (nucleus= _____ charged)
- Electrons revolve in _____ around the nucleus₄

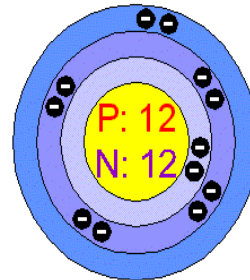
Atomic Theory

- Neils Bohr (1913)
 - ***Expanded on Rutherford's Theory
 - The electrons could move in _____ within the orbitals.
 - Each _____ level represents a certain amount of _____

• Ex. 1



Ex. 2

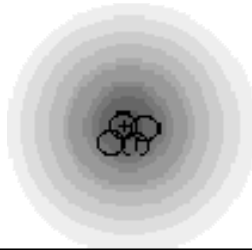


Bohr model continued

- The lowest energy state is called _____ (closest to the nucleus)
- If an atom _____ energy, electrons from ground state can move to a _____ energy level
- If an atom _____ energy and moves back to a _____ energy state, _____ is emitted. (Seen in neon lights, stars etc.)

Modern (Quantum) Atomic Theory or the Electron Cloud Theory

- **Expanded on Rutherford's Theory
- Electrons and orbitals exhibit both _____-like and _____-like properties
- Cannot locate an electron with _____ at any given time due to _____-like properties



7

Atomic Structure

- Nucleus
 - Contains _____ (__) and _____ (_____)
 - Overall _____ (__) charge
 - Mass of _____ and _____ are approximately _____
- Electrons
 - _____ charged particles
 - Mass of electron is much _____ than that of Protons and neutrons
 - Travel in pathways called _____

8

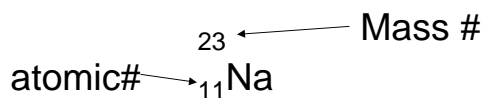
Atomic Structure

- Protons and electrons have _____ charges (makes atoms _____)
- Each atom is defined by its _____ number (# of _____)
- Mass Number = the sum of the _____ and _____ in the nucleus
- Atomic Mass = weighted _____ of atomic masses of all _____ of an element

9

Atomic Structure

- Isotopes = atoms of the same element with different number of _____
- Example:
 - C-12
 - C-13
 - C-14 ← Mass # } all have three have ___ protons and different amounts of _____
- Nuclear Notation: consist of _____, _____ and sometimes _____



10

Calculating average Atomic Mass

- $((\text{mass1})(\% \text{ Isotope1})) + ((\text{mass2})(\% \text{ Isotope2})) + \dots$
- ***Must convert percentage into _____**
- ***Percentages have an infinite amount of sig figs**
- The element Boron has 2 isotopes. Boron-10 has a mass of 10.013 amu and an abundance of 19.9%. Boron-11 has a mass of 11.0093 amu and an abundance of 80.1%. Calculate the atomic mass for this element. (amu= atomic mass units)

11

Average atomic mass continued

- An element consists of 2 isotopes. Isotope A has an abundance of 75% and a mass of 14.000 amu. Isotope B has an abundance of 25% and an atomic mass of 15.00 amu. What is this element's atomic mass?

12

Valance Electrons

- Electrons in the _____ of an atom
- Found only in '___' and '___' sublevels
- Important in _____ between _____
- Group 1= ___ valence electron
- Group 2= ___ valence electrons
- Group 13-18= have valence electrons equal to their group number minus ____.
 - Ex. Group 16= ___ valence electrons
 - Ex. Group 13= ___ valence electrons

13

Lewis Structures or Electron Dot Diagrams

- Used to identify _____
- Divides an atom into two parts
 - _____: equal to the nucleus and all non-valence electrons
 - _____
- To draw the structure:
 - Kernel is represented by _____
 - Valence electrons are represented by _____ surrounding symbol ('___', fills first up to _____ electrons, then each '___' gets _____ electron before it gets a _____)
 - Ex.

X

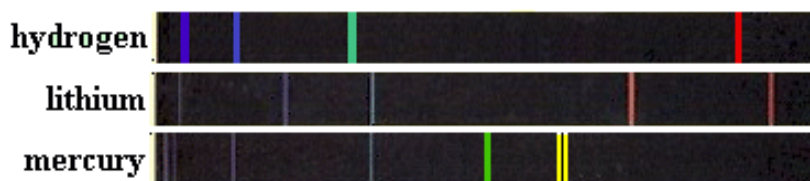
14

Lewis Structures or Electron Dot Diagrams

- Possible arrangements for 1-8 electrons

15

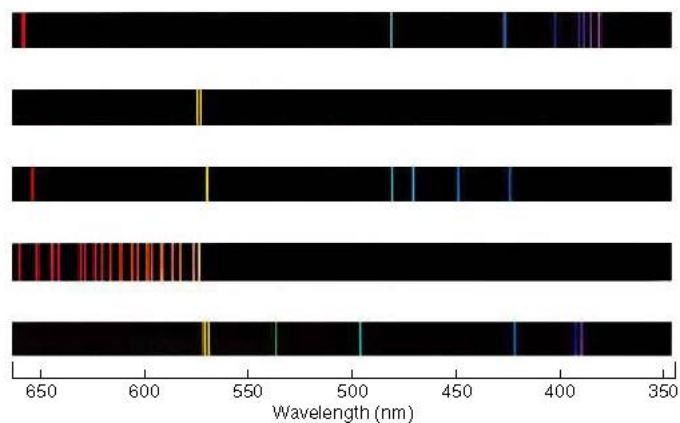
Bright Line Spectrum



- An atom may _____ and have an electron '_____' into a _____ energy level (_____ state).
 - This is an _____ state.
- _____ is emitted from the atom as the electron moves _____ to the ground state.
- This light can be seen in a series of _____ represented by _____.

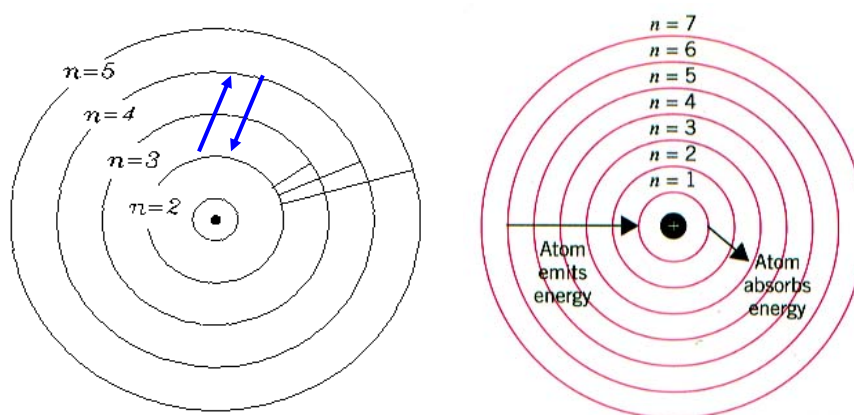
16

Bright Line Spectrum continued



17

Excited state configuration



18

Excited state configuration

- To determine if atom is in the _____, compare _____ from the Periodic table to those given.
 - Ex. Sr → 2-8-18-8-2 is the _____ configuration
 - Excited state configuration could be:
 - 2-8-18-7-3 (a move from __th → __th)
 - 2-8-17-9-2 etc. (a move from __rd → __th)