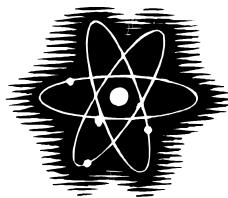


# Atoms

Mr. Sudbury



## Atoms

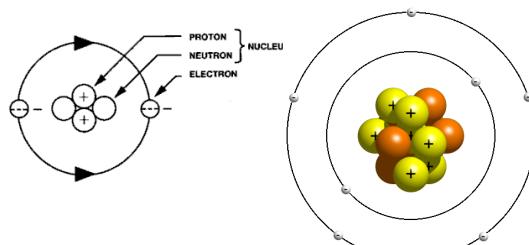
- ▶ **Atoms** are the fundamental building blocks of all matter.
  - An **atom** is the smallest unit of an element that maintains properties of that element.
- ▶ All **matter** is composed of atoms.
- ▶ An **element** is a pure substance made only of one type of atom.
- ▶ Atoms can combine with other atoms to make **compounds** or **molecules**.

## Structure of an Atom

- ▶ Atoms contain 3 fundamental parts:
- ▶ AKA – Subatomic particles
  - Protons
  - Neutrons
  - Electrons

Particle	Location	Charge	Mass (g)	Mass (amu)
Proton	Nucleus	+1	$1.6726 \times 10^{-24}$	1
Neutron	Nucleus	0	$1.6749 \times 10^{-24}$	1
Electron	Electron Cloud	-1	$9.0193 \times 10^{-28}$	0

## Atomic Structure



## Identifying Atoms

- ▶ You can find out everything you need to know about a atom from the periodic table.
- ▶ The number of protons in an atom is the atomic number.
- ▶ In an atom, the number of electrons in an atom is also the atomic number.
  - (This may change later → ions)
- ▶ In an atom the mass of the nucleus is the mass number. (This is how you determine the number of neutrons.)

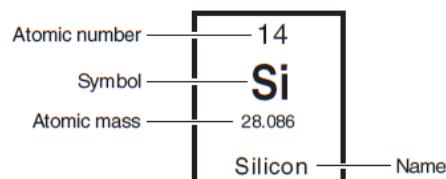
## Nucleus of an Atom

- ▶ The mass number is the atomic mass of the atom.\*\*
- ▶ Since the electrons have basically no mass, the mass number is the mass of the nucleus.
- ▶ The mass of the nucleus (in amu) is the sum of everything in the nucleus.
- ▶ Since atomic number tells you protons, then you can subtract the number of protons from the mass number to determine how many neutrons an atoms has.

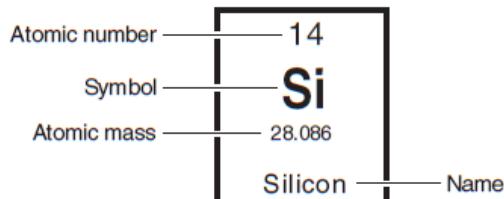
## Remember That....

- ▶ **Atoms are electrically neutral.**
  - This means the positive protons and negative electrons have to be the same number to cancel each other out.
- ▶ **Atomic Mass** - The average of all nuclides of an atom. (# on PT)
- ▶ **Mass number** – The number of P & N in the nucleus. (whole #, or rounded from PT)

## Atom Identification from PT



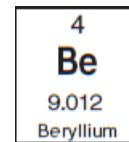
## Atom Identification from PT



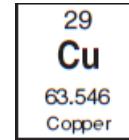
- ▶ How many p<sup>+</sup>
- ▶ How many e<sup>-</sup>
- ▶ How many n<sup>0</sup>

## Atom ID from PT

- ▶ How many p<sup>+</sup>
- ▶ How many e<sup>-</sup>
- ▶ How many n<sup>0</sup>

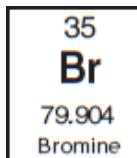


- ▶ How many p<sup>+</sup>
- ▶ How many e<sup>-</sup>
- ▶ How many n<sup>0</sup>

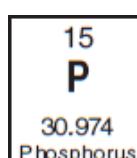


## Atom ID from PT

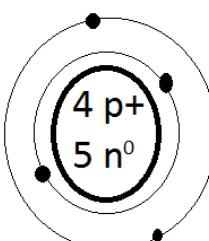
- ▶ How many p<sup>+</sup>
- ▶ How many e<sup>-</sup>
- ▶ How many n<sup>0</sup>



- ▶ How many p<sup>+</sup>
- ▶ How many e<sup>-</sup>
- ▶ How many n<sup>0</sup>



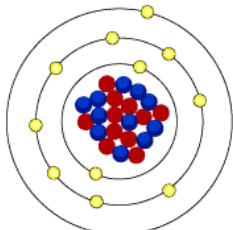
## What atom is this?



1A		2A	
1	H 1.008 Hydrogen	2	Be 9.012 Beryllium
3		4A	
11	Na 22.990 Sodium	12	Mg 24.305 Magnesium
19	K 39.098 Potassium	20	Ca 40.078 Calcium
37	Rb 85.468 Rubidium	21	Sc 44.956 Scandium
38	Sr 87.62 Strontium	22	Ti 47.867 Titanium
39	Y 88.906 Yttrium	40	Zr 91.224 Zirconium

## What atom is this?

- Atomic mass of 22 amu.



	1 1A		
1	1 H Hydrogen	2 2A	
2	3 Li Lithium	4 Be Beryllium	
3	11 Na Sodium	12 Mg Magnesium	3B 3B
4	19 K Potassium	20 Ca Calcium	21 Sc Scandium
5	37 Rb Rubidium	38 Sr Strontium	39 Y Yttrium
			40 Ti Titanium
			47.957 Zr Zirconium

## Review

- Protons, neutrons, electrons
  - Location, charge, mass
- Using the Periodic Table
  - Determining p, n, & e in an atom
- Identifying atoms

- The End