

Name _____ Date _____
Teacher _____ Period _____

Electrostatics Notes

Electrostatics

Electrostatics is _____

Chem 101

What particles make up the nucleus? _____

What part of the atom travels in orbitals outside of the nucleus? _____

The nucleus of an atom is _____ charged.

Since most atoms have the same amount of protons and electrons, they start with a _____ charge.

Electrical Charge

1 Coulomb = charge of 6.25×10^{18} electrons or protons

| Particle | Charge |
|----------|--------|
| Proton | C |
| Electron | C |
| Neutron | C |

Sample Problem 1

There are 500 electrons taken off of the surface of a metal sphere. What is the charge of the sphere?

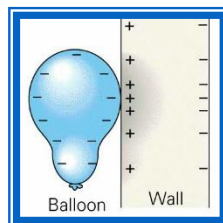
A balloon is rubbed on a sweater, giving it a charge of -1.0×10^{-16} C. How many excess electrons are on the balloon?

Conserving Charge

- Charges are not made, they are _____.
- These charges can be _____ from one object to another.
- The net charge in an isolated system remains _____.

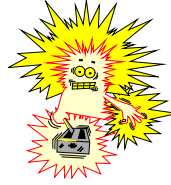
Separating Charges

- Friction
 - Addition of energy can separate the charges
 - Ex: rubbing hair with balloon
 - hair becomes (+) charged, balloon becomes (-) charged
 - Ex: rubbing a rubber rod with fur
 - rod becomes (-) charged, fur becomes (+) charged
 - Ex: rubbing a glass rod with silk
 - rod becomes (+) charged, silk becomes (-) charged
- Polarization
 - Separating charges within an object

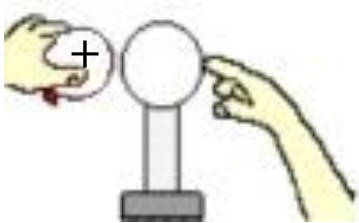


Separating Charges (cont.)

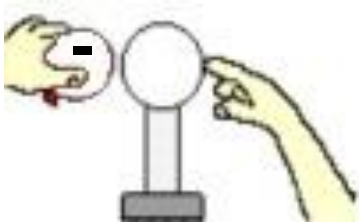
- Conduction
 - touching a neutral body with a charge body



- Induction
 - Causing electrons to move because of a charge placed close to an object (not touching)
 - Residual charges will stay on the conductor if it is grounded during induction



Electrons flow from the ground to the _____, leaving the sphere _____ charged.



Electrons flow from the sphere to the _____, leaving the sphere _____ charged.

Insulators

- Materials in which charges _____ move through easily
- Valence (surface) electrons are _____ bound
- Excess electrons do not spread out and will not transfer easily
- Examples: Plastic, rubber, glass, dry air

Conductors

- Materials in which charges are _____ to move through easily
- Valence (surface) electrons are _____ bound
- Electrons carry or conduct the charges through the material
- Excess electrons spread evenly on the surface of the conductor and will transfer easily
- Examples: copper, aluminum, graphite