

Conductors and Insulators

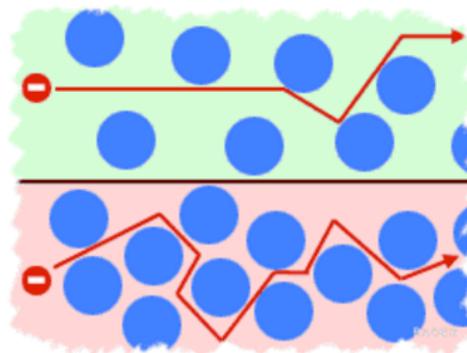
“He who believes in Me, as the Scripture has said, out of his heart will flow rivers of living water.”
John 7:38

Conductors

- Conductors are materials that permit electrons to flow freely from particle to particle.
- If charge is transferred to the object at a given location, that charge is quickly distributed across the entire surface of the object.
- If a charged conductor is touched to another object, the conductor can even transfer its charge to that object. The transfer of charge between objects occurs more readily if the second object is made of a conducting material.
- Metals are traditional conducting materials. There are a lot of free electrons in metallic conductors. Free electrons are electrons that are not being held in atoms, and so, can move easily. Some of the best metallic conductors are copper (Cu), silver (Ag), and gold (Au).
- There are some conductors that are not metals. Carbon is the best example.
- A solution such as saltwater has a lot of free ions floating around. Those ions (charged atoms) can flow easily, and ionic solutions are very good conductors. Water normally contains dissolved ions, and if lightning hits the liquid (solution), it might conduct electricity long distances and electrocute you.
- The human body is more of a conductor than insulator. When the body acquires a static charge it has a tendency to distribute that charge throughout the surface of the body. Given the size of the human body, relative to the size of typical objects used in electrostatic experiments, it would require an abnormally large quantity of excess charge before its effect is noticeable.
- Many are familiar with the impact that humidity can have upon static charge buildups. Winter months tend to be the driest months of the year with humidity levels in the air dropping to lower values. Water has a tendency to gradually remove excess charge from objects. When the humidity is high, a person acquiring an excess charge will tend to lose that charge to water molecules in the surrounding air. On the other hand, dry air conditions are more conducive to the buildup of static charge and more frequent electric shocks.

Insulators

- Insulators are materials that impede the free flow of electrons from atom to atom and molecule to molecule. If charge is transferred to an insulator at a given location, the excess charge will remain at the initial location of charging.
- The particles of the insulator do not permit the free flow of electrons; subsequently charge is seldom distributed evenly across the surface of an insulator.



THE SMOOTHER TOP PATH
SHOWS A GOOD CONDUCTOR.
THE BOTTOM IS POOR.