

## Static Electricity

**Static electricity**, or **electrostatics**, refers to the build-up of electric charges on the surface of an object. These static charges remain on an object until they are either removed (by grounding), discharged (by a spark), or transferred to a different object (by contact).

The effects of static electricity are familiar to most of us because we can feel, hear, and even see the effects of it in our daily lives. Some examples include getting shocked, static cling, lightning, etc.

### Conductors and Insulators

An **insulator** is a material that does not allow charges to move freely on or through it. Despite this, many insulators can be given a static electric charge, typically by rubbing the insulator with another material.

Once charges are placed on an insulator, they do not move around. They will remain where they were originally placed until removed, discharged, or transferred to a different object.

Examples of Insulators: rubber, plastic, fur, silk

A **conductor** is a material that allows charges to move freely on or through it. It is difficult to give a static charge to a conductor, since the conductor will easily lose the charge if touched by any kind of conducting material (e.g. your hand).

Once charges are placed on a conductor, they will spread out evenly throughout the material.

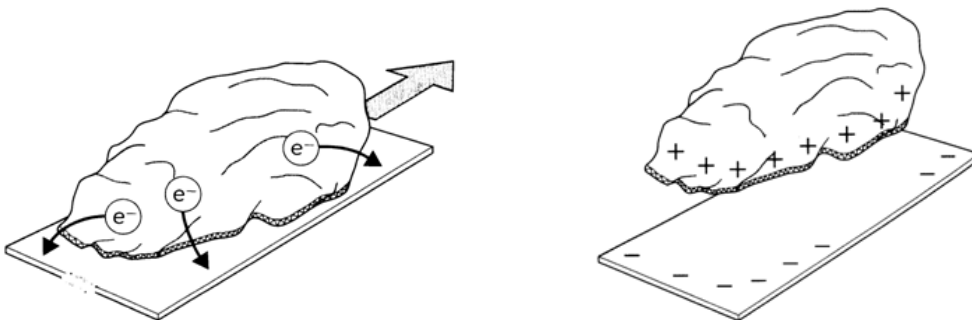
Examples of Conductors: most metals

### Methods of Charging

There are three different methods of placing a static charge on an object: friction (rubbing), conduction, and induction.

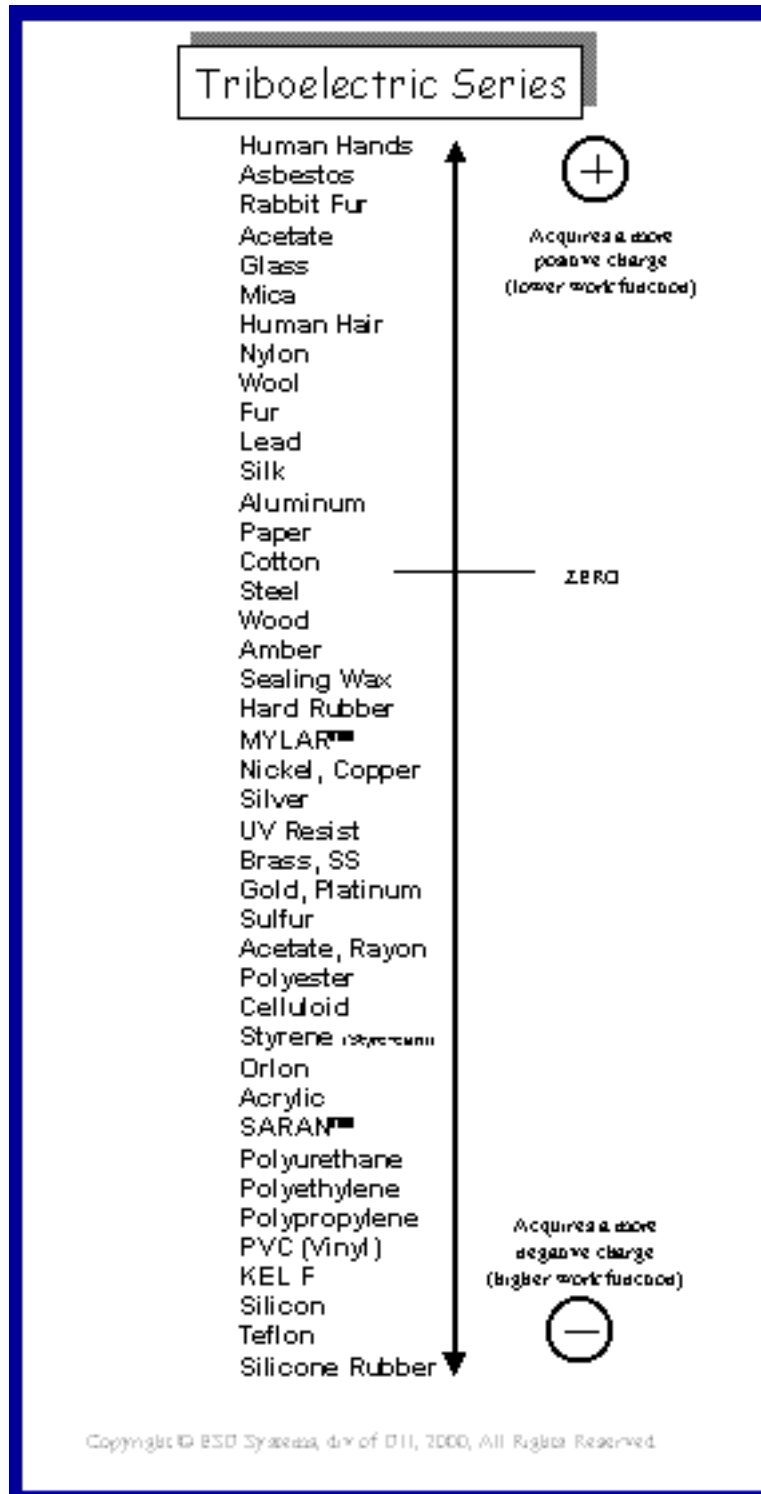
#### Charging by Friction

When two insulators are rubbed together, electrons are transferred from one material to the other. The material that loses electrons becomes positively charged. The material that gains electrons becomes negatively charged.



The table shown below is called a triboelectric series. When two insulators are rubbed together, this table can be used to determine which will become positive and which will become negative.

Whichever material is higher on the table will become positive. The one that is lower on the table will become negative. The farther apart the two materials are, the more charge will be transferred.





## Worksheet

1. What is the charge of an electron?
2. What is the charge of a proton?
3. Would two electrons attract or repel each other?
4. Would an electron and a proton attract or repel each other?