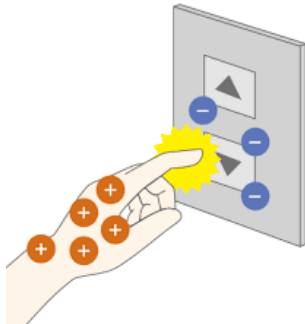


## Static electricity (靜電)

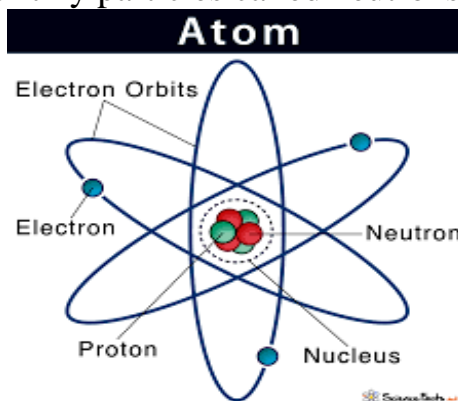


### Introduction :

- build up of an electrical charge on the surface of an object
- “static”— the charges remain in one area rather than moving or "flowing" to another area.

### Principle:

- Atoms are made up of tiny particles called neutrons, protons, and electrons.

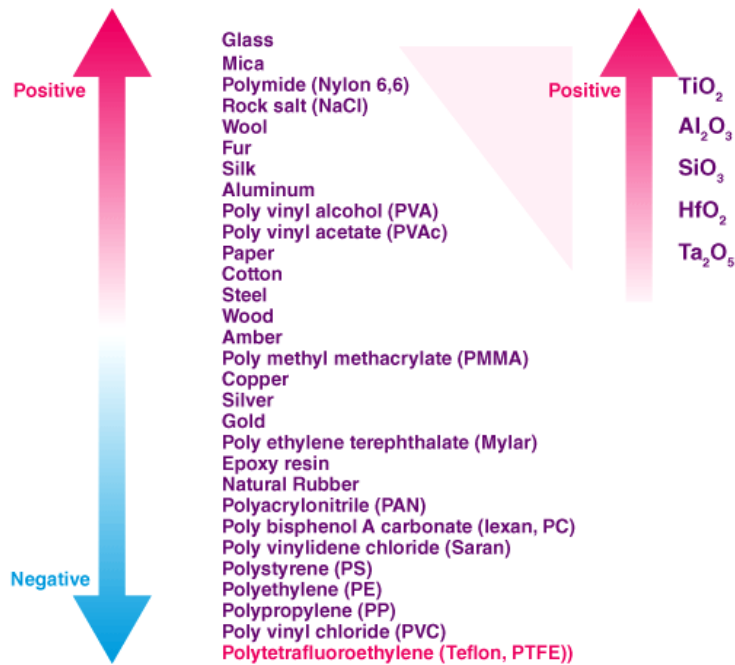


- A static charge is formed when two surfaces touch each other and the electrons move from one object to another.  
⇒ One object will have a positive charge and the other a negative charge.

### Types:

#### 1) Friction

- Two materials are rubbed together, the surface electrons move from one object to another object.
- The direction of electrons moving is depends on the Triboelectric Series (摩擦電序) refer to figure 1



**Figure 1**

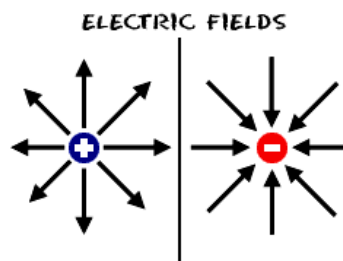
- ⇒ Materials on the positive side of the Triboelectric Series will tend to give up their surface electrons and become positively charged
- ⇒ Materials on the negative side of the series tend to gain electrons and become negative charged
- ⇒ The greater exchange of electrons, the higher charge is generated.

2) Separation

- similar to that of friction.

3) Induction

- materials are in the presence of a strong electric field, static charges can be generated



- ⇒ The method of charging is caused by ionization of the air between the surface of the material and the voltage source
- ⇒ carries surface electrons away from the material to the source

**Found in daily life:**

1) **Pollution manage**

- ⇒ Static electricity is utilized in pollutants management by making use of a static fee to dust particles in the air after which collecting those charged particles on a plate or collector of the opposite electric charge.

## 2) **Xerography**

- ⇒ Your photocopier or Xerox system makes use of static electricity to replicate print to a page.
- ⇒ One form of this device electrically charges ink so that it will accumulate on the paper in the detailed areas. Another model of a photocopier makes use of expenses to paste the link to a drum, which then transfers it to the paper.

## 3) **Air fresheners**

- ⇒ Some people purchase what is known as air ionizers to freshen and purify the air of their homes. The work is on a similar principle as the smokestack pollutants manage.
- ⇒ These devices strip electrons from smoke molecules, dust particles, and pollen in the air, simply as what happens in creating static electricity.
- ⇒ These charged dust and smoke particles are then drawn to and stuck to a plate at the device with the opposite charge. After a while, lots of the pollutants are drawn from the air.

## **Factors affecting static electricity**

### 1) **Types of Material**

- ⇒ acetate gains a charge very readily whilst glass will gain a charge less readily.
- ⇒ the relative position of materials on the Triboelectric Series will determine whether a material charges positively or negatively dependent on the other material with which it has come into contact

### 2) **Humidity**

- ⇒ the dryer the environment, the higher the level of static charge and conversely the higher the humidity, the lower the static charge.
- ⇒ Atmospheric humidity deposits small quantities of water on all surfaces in their environment
- ⇒ surface static charges on materials have a tendency to dissipate to earth by current flow through the surface moisture.

### 3) **Repetition**

- ⇒ Repeated actions such as friction or separation will increase the level of charge found on a material.

### 4) **Battery effect**

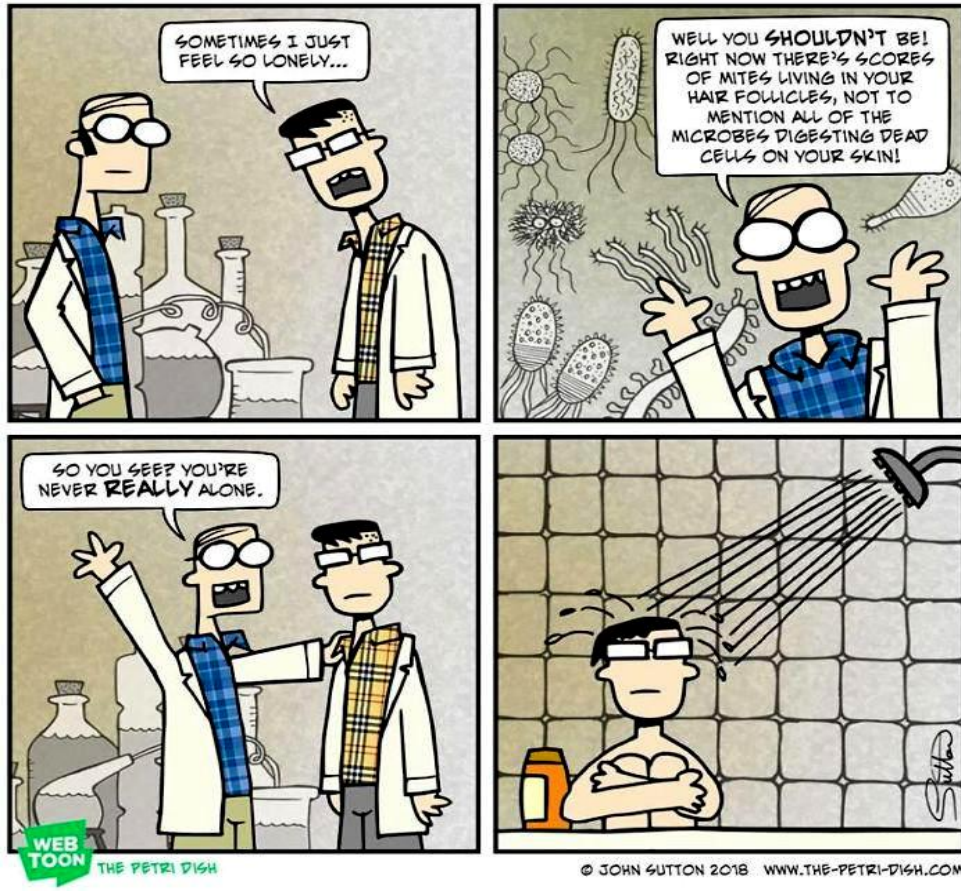
- ⇒ The combination of many charged items can lead to extremely high charges.

### 5) **Change of temperature**

- ⇒ As a material cools down it has a tendency to generate charge.

# the Petri Dish

BY JOHN SUTTON



## RELAXING ZONE

|   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|---|
|   | 7 | 8 |   |   |   | 3 |   |   |
|   | 2 | 3 |   |   | 6 | 5 | 8 | 1 |
|   |   |   |   |   |   |   | 9 | 7 |
|   |   | 7 | 2 | 8 | 1 |   |   | 6 |
|   |   |   |   | 9 | 4 |   | 1 |   |
|   |   |   |   |   |   |   | 7 | 4 |
| 3 |   | 5 | 1 |   |   |   |   |   |
|   | 8 | 4 |   | 6 |   |   |   |   |
| 7 |   | 2 |   | 5 |   |   |   |   |

|   |   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|---|---|
| 6 | 9 | 4 | 1 | 8 | 5 | 3 | 2 | 9 | 7 |
| 3 | 8 | 7 | 2 | 6 | 9 | 4 | 8 | 1 | 8 |
| 8 | 6 | 2 | 7 | 4 | 1 | 5 | 9 | 6 | 3 |
| 4 | 7 | 2 | 5 | 3 | 6 | 9 | 1 | 8 | 8 |
| 5 | 1 | 8 | 4 | 7 | 9 | 6 | 3 | 2 | 2 |
| 6 | 3 | 9 | 1 | 8 | 2 | 7 | 4 | 7 | 5 |
| 7 | 4 | 9 | 3 | 2 | 8 | 1 | 5 | 1 | 9 |
| 1 | 8 | 5 | 6 | 7 | 4 | 3 | 2 | 7 | 6 |
| 2 | 3 | 2 | 9 | 1 | 5 | 8 | 7 | 8 | 4 |

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