

Electrostatics

Static electricity:

Types of charge:

There are two main types of charge: *Positive charge* and *Negative charge*. The atom consists of electrons, protons and neutrons. The charges on these parts cannot be changed.

Neutral objects:

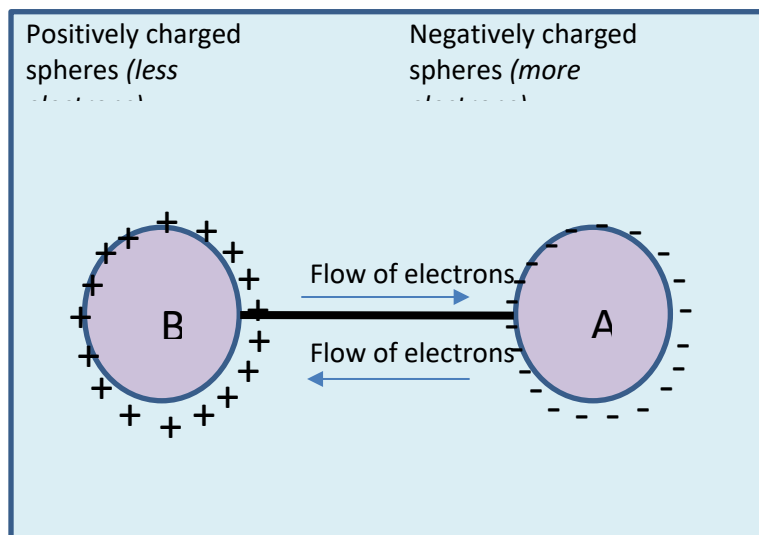
Possesses the same number of protons and electrons, charge = zero.

Positively charged objects:

Possesses more positive charge (protons) than negative charge (electrons). The object is positively charged because it has too few electrons.

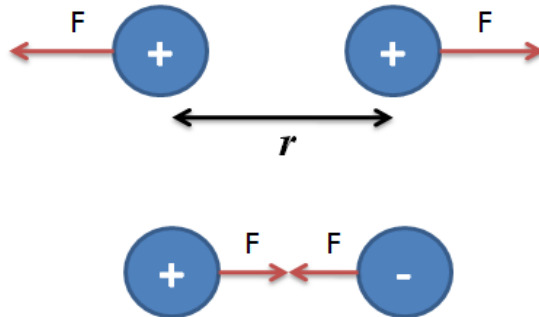
Negatively charged objects:

Possesses less positive charge (protons) than negative charge (electrons). The object is negatively charged because it has too many electrons.



Forces between charges:

Similar charges repel each other while different charges attract each other.



Charges that comes into contact and are then separated:

When two objects with different charges touch, they transfer their charges. When the objects are then separated they will have the same charge:

$$Q \text{ on each} = \frac{Q_1 + Q_2 + Q_3 \dots n}{n}$$

Charge is measured in Coulomb (C):

Micro Coulomb: 1×10^{-6} (μC)

Nano Coulomb: 1×10^{-9} (nC)

Pico Coulomb: 1×10^{-12} (pC)

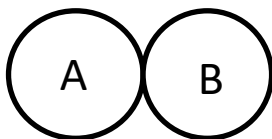
Before contact



Charge on object A before contact = 1C

Charge on object B before contact = 1C

Contact



Contact will allow the objects to exchange charges. The new charge on the objects:

$$\frac{1+1}{2} = 1 \text{ Coulomb on each object.}$$

After contact



Principles of quantization:

An object has a charge which is an integer multiple of the elementary charge of an electron.

$Q = nq$ with Q the charge of the object in Coulomb and q the charge of an electron ($1,6 \times 10^{-19}\text{C}$)

There can be a difference in charge: **$\Delta Q = Q_{\text{end}} - Q_{\text{start}}$**