

Electrostatics
Electric charges

Charge separation due to contact

Object of the experiment

1. Investigating charge separation when two friction rods are hit together

Setup

- Hit the discharged friction rods together several times. Then hold them apart in your hands.
- Hold the PVC rod in the Faraday's cup so that about a quarter of its length is inside the cup, and observe the deflection of the multimeter pointer.
- Do the same with the acrylic rod.
- Then hold the two rods in the Faraday's cup simultaneously, and observe the deflection of multimeter pointer again.

Measuring example

Friction rod	Polarity of the charge
PVC	-
Acrylic	+
PVC and acrylic	0

Evaluation

When two friction rods are hit together, charge separation takes place.

In the course of charge separation electrons are transferred from one friction rod (e.g. acrylic) to the other (e.g. PVC).

The friction rod which has lost electrons (acrylic) carries a positive charge after the process of friction.

The friction rod which has acquired electrons (PVC) carries a negative charge.

The polarities of the charged friction rods are always of opposite signs.

The magnitudes of the charges are equal.

Apparatus

1 Electrometer amplifier.....	532 14
1 Connecting rod	532 16
1 Faraday's cup.....	546 12
1 Clamping plug.....	590 011
1 Capacitor, 1 nF, STE 2/19	578 25
1 Capacitor, 10 nF, STE 2/19	578 10
1 Friction rods, PVC and acrylic.....	541 00
1 Butane gas burner	666 711
1 Butane cartridge 19 g, set of 3.....	666 712ET3
1 Demo multimeter, passive	531 906
1 Power supply, 450 V.....	522 27
1 Connecting leads, 19 A, 50 cm, black, pair	501 451
1 Connecting leads, 19 A, 50 cm, red/blue, pair.....	501 45
1 Connecting lead, 19 A, 50 cm, yellow/green	500 420

Carrying out the experiment

Remark:

Before carrying out the experiment, discharge the friction rods and the Faraday's cup in order to obtain exact experiment results.

For discharging the friction rods, quickly move them longitudinally through the non-luminous flame of the cartridge burner several times. The Faraday's cup is discharged by touching it with the connecting rod until the multimeter displays a voltage of $U = 0$ V.