

Dielectric constant of different materials 4.2.06-00



What you can learn about ...

- Maxwell's equations
- Electric constant
- Capacitance of a plate capacitor
- Real charges
- Free charges
- Dielectric displacement
- Dielectric polarisation
- Dielectric constant

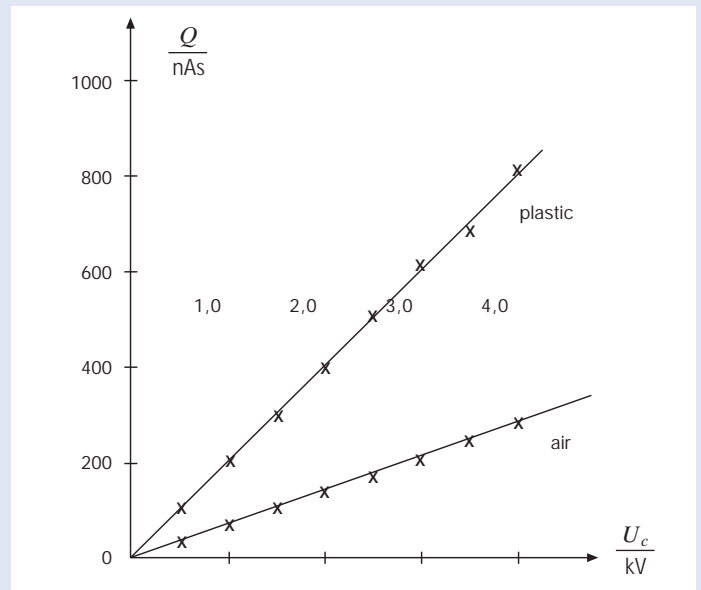
Principle:

The electric constant ϵ_0 is determined by measuring the charge of a plate capacitor to which a voltage is applied. The dielectric constant ϵ is determined in the same way, with plastic or glass filling the space between the plates.

What you need:

Plate capacitor, $d = 260$ mm	06220.00	1
Plastic plate 283 x 283 mm	06233.01	1
Glass plate for current conductors	06406.00	1
High value resistors, 10 M Ω	07160.00	1
Universal measuring amplifier	13626.93	1
High voltage supply 0...10 kV	13670.93	1
Capacitor 220 nF/250 V, G2	39105.19	1
Voltmeter 0.3...300 V-, 10...300 V-	07035.00	1
Connecting cable, 4 mm plug, 32 A, green-yellow, $l = 10$ cm	07359.15	1
Connecting cable, 4 mm plug, 32 A, red, $l = 50$ cm	07361.01	1
Connecting cable, 4 mm plug, 32 A, blue, $l = 50$ cm	07361.04	1
Connecting cable, 30 kV, $l = 500$ mm	07366.00	1
Screened cable, BNC, $l = 750$ mm	07542.11	1
Adapter, BNC socket - 4 mm plug	07542.20	1
T type connector, BNC, socket, socket, plug	07542.21	1
Adapter, BNC plug/4 mm socket	07542.26	1

Complete Equipment Set, Manual on CD-ROM included
 Dielectric constant of different materials P2420600



Electrostatic charge Q of a plate capacitor as a function of the applied voltage U_c , with and without dielectric (plastic) between the plates ($d = 0.98$ cm)

Tasks:

1. The relation between charge Q and voltage U is to be measured using a plate capacitor.
2. The electric constant ϵ_0 is to be determined from the relation measured under point 1.
3. The charge of a plate capacitor is to be measured as a function of the inverse of the distance between the plates, under constant voltage.
4. The relation between charge Q and voltage U is to be measured by means of a plate capacitor, between the plates of which different solid dielectric media are introduced. The corresponding dielectric constants are determined by comparison with measurements performed with air between the capacitor plates.