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Electroscope – Metal Case, Round Window, Aluminum-Leaf #4-50140

Warning:

- **Not a toy; use only in a laboratory or educational setting.**
- **California Proposition 65 Warning: This product may contain chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.**



Introduction

An Electroscope is an instrument used for detecting electric charges or for measuring small electric voltages or currents. It is used in the laboratory—for experiments and demonstrations—and in industry, where it is connected to meters and other sensing devices. The electroscope consists of a metal box with a glass panel in the front and back for viewing. Two strips of aluminum are suspended from a metal rod that conducts electricity. The rod is held in place in the top of the box by a rubber stopper, an insulating material.

The strips of aluminum hang straight down when they are not charged. When a charged body is brought near the metal knob, both strips acquire a like charge (that is, they both become negative or both become positive). As a result, they repel each other and spread apart to form an inverted V. The electroscope is then charged. If an oppositely charged body is brought close to the knob, the charge on the strips is neutralized, and they again hang straight down. The electroscope loses its charge.

The electroscope can also be charged without touching it to a charged object, by electrostatic induction. If a charged object is brought near the electroscope, the leaves spread apart, because the electric field of the object causes the charges in the electroscope to separate. Charges of the opposite polarity to the charged object are attracted to the electroscope rod, while charges with the same polarity are repelled, causing the leaves to spread.

By using a specially calibrated microscope to observe the movement of the strips, a scientist can measure the voltage of the charge in micro-volts (millionths of a volt). When the electrical capacities of both the electroscope and the body producing the charge are known, electric currents moving through ionized air can be measured, even when the capacities are not known, these currents can be detected. Therefore, the electroscope is used for detecting X rays, cosmic rays, and radiation from radioactive material. These rays ionize the air and pass through it as a kind of electric current. The current either



charges or discharges an electroscope.

Experiment with your electroscope by using different types of materials to create a charge. For example, use a glass rod with a silk pad to create a charge. Then touch the glass rod to the ball at the top of the electroscope. You may also want to experiment with ebonite or polypropylene rods and wool or animal fur pads.


