



Concept:

This demonstration utilizes friction (rubbing) between two sources of different polarizability to remove or add electrons from one material and then transfer this excess charge onto the electrostatic demonstrator. The rubbing process typically scrapes off about 10^{10} surface electrons per mole of material, which may seem large, but in fact is only a tiny fraction of the total number of electrons, which is $\sim 10^{24}$ or 10^{25} per mole. Although the polarities of the polycarbonate or PVC rod that result from rubbing are opposite to one another, the transfer of this charge to the electrostatic demonstrator produces, for both rods, the repulsion of the electrostatic demonstrator needle from the similarly charged main stem of the electrostatic demonstrator.

Equipment:

1. Spotlight
2. Lab Jack
3. Electrostatic Demonstrator
4. Polyester Felt
5. PVC Rod
6. Polycarbonate Rod

Procedure:

1. Verify that the electrostatic demonstrator needle is unlatched and free to move.
2. Vigorously rub the polycarbonate rod with the felt to give the rod a positive charge.
3. Hold the rod over (but not touching) the electrostatic demonstrator plate and notice that needle registers the charge strength.
4. Repeat steps 1-3 using the PVC rod (the PVC rod will obtain a negative charge).

Notes and Extras:

- If the electrostatic demonstrator becomes charged, discharge it by touching the metal hook on the plate and the metal housing at the same time with your hand.
- Discharge the rods by rubbing them with your hand (this works best if you have sweaty hands).
- Use the spotlight to project a large image of the electrostatic demonstrator for easier visibility.