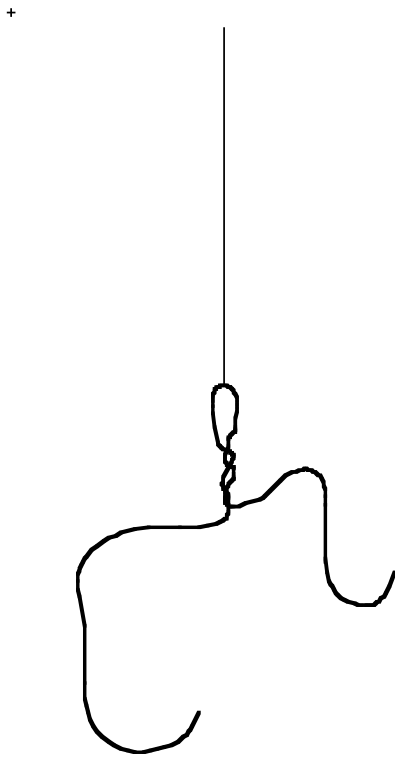


Suggestions for a simple experiment to test the triboelectric properties of assorted materials (Comments? layton@physics.ucla.edu)

Since the theory and even the experimental evidence for the triboelectric properties of assorted materials is not well understood, an interesting student project might be to test assorted materials and rank them in a triboelectric series. If the solid materials can be made into short thin rods or strips, they could be placed in a simple torsion balance cradle as illustrated below:



This simple “torsion cradle” can be made with any soft wire such as the type used to tie rebar together or even insulated copper wire used in house wiring. The support “fiber” can be any non-twisted string like fishing line or even a nylon guitar string. The important thing is to have the support fiber be non-twisted so when the test material is loaded into the cradle, it will not be necessary to wait for the cradle to seek a new rest position. This torsion pendulum type of device is very sensitive and was used both by Coulomb and Cavendish when they were investigating the original evidence of electrostatic (Coulomb) and gravitational (Cavendish) forces. The experimental procedure is to rub one of the solid rod like materials with a different cloth like material. Place the charged rod into the cradle. Then bring another material that has been similarly rubbed near the end of the cradle held material and see if attraction or repulsion occurs. Be suspicious of attraction since even uncharged objects will be attracted. The only sure test will be repulsion, indicating that the materials are of the same-signed charge. Repeated experiments should lead to a triboelectric series table.

Shown on the right is an example of bringing one kind of charged material near a different kind of material that has been placed in the torsion cradle. Repulsion between these two will indicate that they are of the same charge. Repeating this procedure with many different materials should reveal the order of their triboelectric properties.

