

Electric Fleas

More Details

Electrostatic charge

All substances around us consist of positive and negative charges. We usually do not notice this because the charges cancel each other out, i.e. things are electrically neutral.

If the charge is not evenly distributed, but accumulates in one material and is missing in another, the two are electrically charged.

This redistribution takes place because substances hold on to their negative charge, i.e. the electrons, to different degrees. One could say that some materials like electrons better than others. When two materials with very different electron preferences touch, electrons flow to the material that likes electrons better.

Since electrons cannot jump very far, the materials must come very, very close. Just holding them against each other is usually not enough – you have to rub them together. Usually the additional charge flows off immediately. However, it has to stay on insulating materials – and thus things are electrically charged. If the charged materials then come into contact with a metal (or another conductive material), the excess electrons flow off or are replaced from the metal. Sometimes the built-up voltages become so large that real lightning occurs when discharged.

Electron lovers and positivists

The triboelectric series (Greek *tribos* = friction) shows how well electrostatic charging with two substances works:

Leather Glass Hair Wool Fur Silk Paper Cotton Polyester PVC

At the beginning are the substances that prefer to be positive, at the end the electron lovers. The further two substances are apart in the series, the more they are charged on contact, namely the one above is positive, the one below negative. So if you pull a polyester jumper over your head, your hair will be charged positively. Then they will repel each other and your hair will stand on end. With a wool jumper, the effect is so small that you do not notice it.



Watch out, I am charged!

Most of the time, we notice electrostatic charge in a rather unpleasant way: when getting out of the car, we sometimes get an electric shock, hair stands on end after combing,...

Technology also makes use of electrostatic charge: dusters electrostatically charge the dust and then attract it - cleaning made easy! In photocopiers and printers, the ink gets exactly where it is supposed to go thanks to electrical charging.

However, it gets quite dangerous at times: If, for example, solvents are transferred, they can become charged and burst into flames because of the spark that is produced during discharge. The lightning during thunderstorms also comes as a result of electrostatic charging.