

3-2 Note 2 Charge by Friction etc

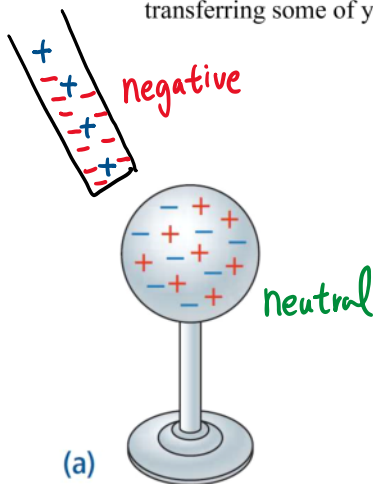
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Science 9 – Ch 3.2 Static Electricity Note 2: Charge by Friction, Conduction, and Induction

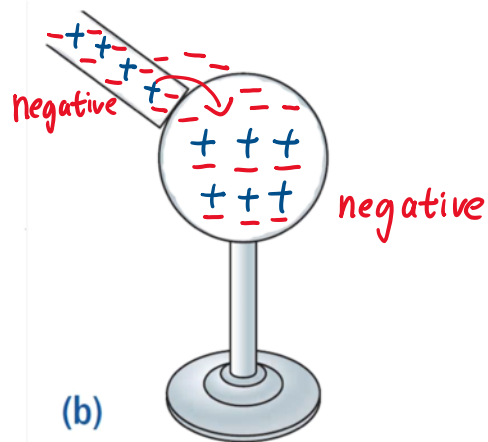
- Three methods of charging:
 1. **Conduction** (contact): occurs when objects touch and an electric charge is transferred from one object to the other
 - both objects will have the same charge at the end
 2. **Friction**: occurs when two objects are rubbed together
 - the objects will have opposite charges at the end
 3. **Induction**: results from charging without touching or making any direct contact
 - creates areas of opposite charge on the objects

Charging by Conduction

- Occurs when objects touch and an electric charge is transferred from one object to the other.
 - Ex. When you walk across a carpet and get a spark by touching a metal doorknob, you are transferring some of your charge to the doorknob.



- A neutral metal sphere



When a negatively charged bar contacts the sphere, some of the extra electrons move to the sphere, giving it a negative charge.

Charging by Friction

- This method of charging objects involves rubbing two neutral objects together. The contact allows electrons to be transferred from one substance to the other substance.
- One substance will gain negative electrons (and become negatively charged) while the other will lose electrons (and become positively charged).
- Since the two objects have opposite charges, they will attract each other.

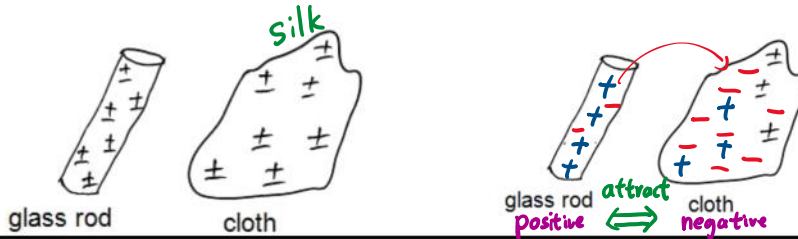


Charging by Friction Cont.

- Use the Electrostatic Series table like one on the right to find out which material are more likely to lose electrons.
- Ex. Electric charge built up on clothes as they tumble against each other in a dryer.
- Ex) a glass rod become positively charged when rubbed with a silk cloth

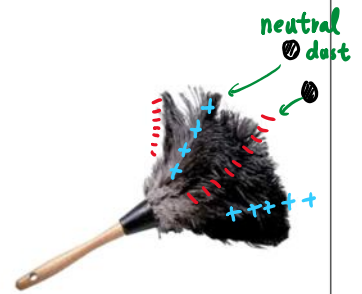
Electron Affinity By Material

(Hold electrons tightly) Most likely to gain electrons and become negative	PVC Rubber Cotton Paper Silk
(Hold electrons loosely) Most likely to lose electrons and become positive	Fur Wool Nylon Hair Acetate Glass

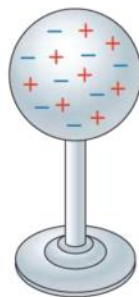


Charging by Induction

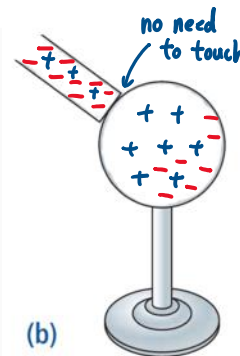
- When objects are charged without touching or making any direct contact
- IF we bring a charged object near to a neutral object, we can induce a charge in the neutral object because electrons will move to get farther away from other electrons or closer to protons.
 - Ex. Pick-up of dust on swiffer duster
 - The many fibers on the duster are negatively/positively charged
 - neutral dust particles stick to charged duster



Ex) What happens when a negatively charged bar comes near the sphere?



(a) A neutral metal sphere



(b)

(b) The charge on the bar causes, or induces, the electrons on the sphere to change their position.