

## 1 | An atom

We begin by recognizing the fact that **it's the electron that can move around in an atom..**

For now, materials could be either **Conductors** or **Insulators**.

- **Conductors**

- $e^-$  move freely
- Think! Metal

- **Insulators**

- $e^-$  cannot move freely
- Think! Wood/Glass/Plastic

## Charge properties

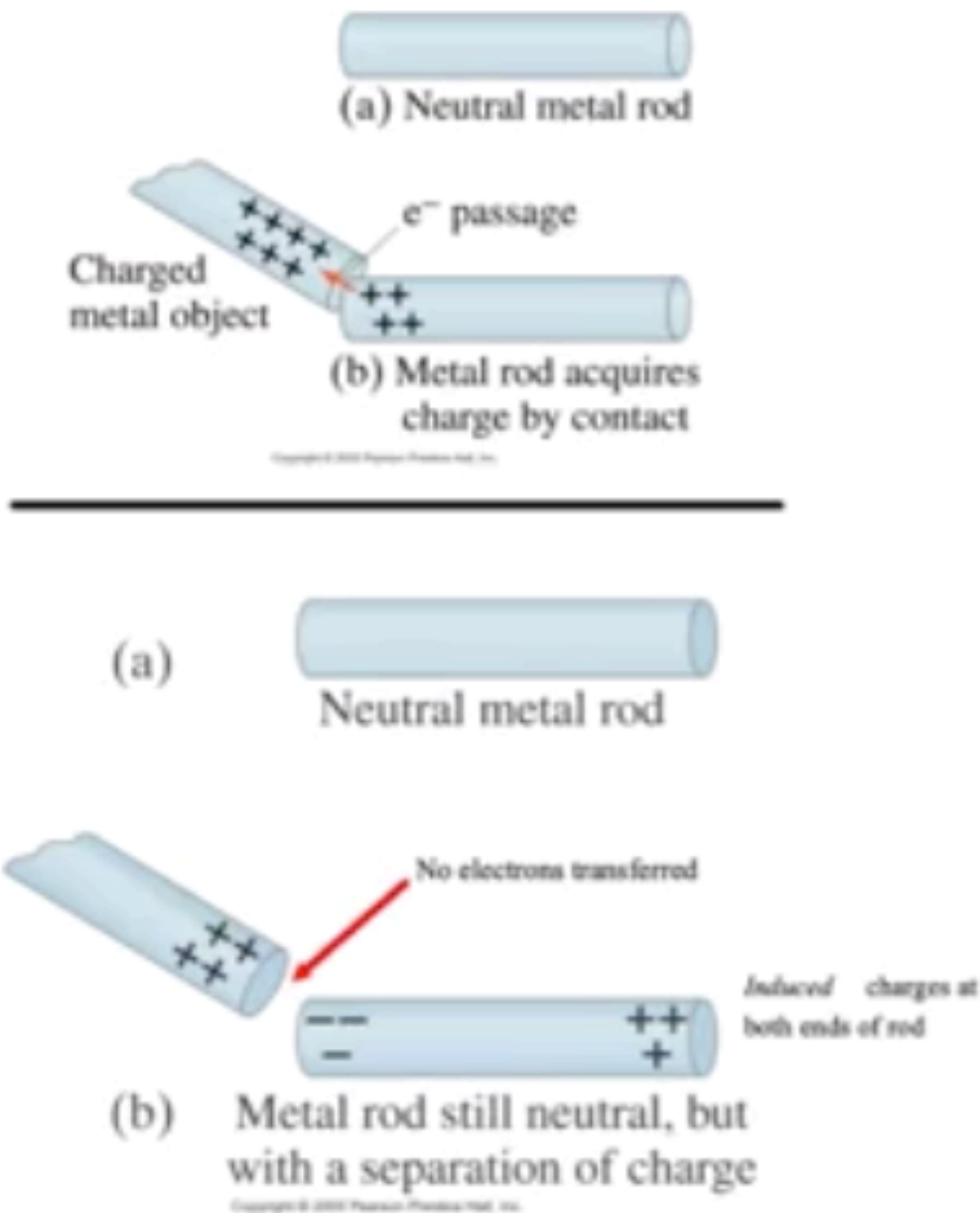
Different materials have tendencies to have a charge when rubbed

- Human hands => very positive when rubbed
- Fur => positive when rubbed
- Steel, Wood, Polyester => meh
- Plastics => negative when rubbed
- Silicon/Teflon => very negative when rubbed

## Charge Interactions

- Like charges tend to repel
- Different charges tend to attract

## Electrons do move



### Scenario 1

- Taking neutral rod + close, positively charged, rod
  - Electrons will move from the neutral rod to the charged rod
  - Balances the charge out

### Scenario 2

- Taking neutral rod + slightly farther, positively charged, rod

- The neutral rod “polarizes”, repelling the positively charged protons off to one side while attracting all the electrons towards it
- There is a net force of attraction to the “left” on the example image — towards the charged rod

Recall that per the physics [KB20200624111828](#) D1 At home Activity, pieces of paper sometime flow towards the charged rod, then back again. Why?

About how that works...

1. The charged rod polarizes the paper
2. The paper's newfound positive end attract with the plastic rod's negative end
3. The paper has a net positive force towards the rod, so it accelerates towards it
4. Electrons, once connected, tries to flow back onto the paper
5. The paper neutralizes, then falls to the ground
6. Repeat from (1)