

Date of Lab 1/30

Date of Submission 2/6

Laboratory Report

Title Physics Lab : Electric Charge - static electricity and electroscope

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Lab Partners Moe Oshima

Summary

In this lab, I observed three kinds of reactions of objects with the charges and uncharges. They were polarization, induction and the reactions of charged objects. I also found that there are three types of object, insulator, conductor, and semi-conductors. And I also found that the objects with stronger electronegativity tend to get electrons and be negative and objects with weaker electronegativity tend to lose electrons and be positive.

- Meet a deadline
- Write logically
- Write clearly
- Write with your own words

Teacher's Comments

In this compact report, Tsukiyo shows clearly many mechanisms in experiments, such as the difference between polarization and induction in Page 2

1	2	3	4	5	6	7	8	9
Due	Summary	Intro.	Method.	Results	Table/Fig.	Discussion	Clearness	General

- * Use this form as a cover sheet.
- * Submit your reports by the seventh day after your lab.

Results and Discussion

[Lab 1] Generate frictional electricity

Results:

	Aluminum coated ball	Polystyrene foam ball
PVC Rod charged with Rabbit Fur (-)	①	②
Glass Rod Charged with Silk (+)	③	④

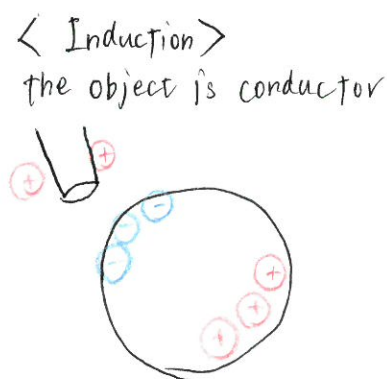
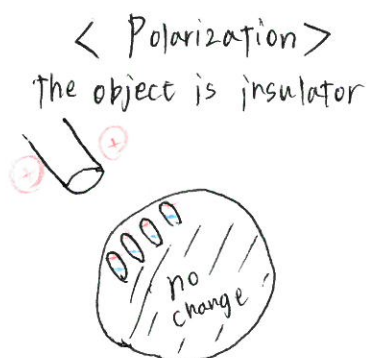
- ① At first, they repelled but after I rubbed the PVC Rod a lot, they attracted each other.
- ② At first, they repelled but after I touched the aluminum ball, they attracted each other.
- ③ Attracted
- ④ Attracted

Discussion:

We could find both polarization and induction.

From ② and ④, the experiments using the Polystyrene foam ball, Polarization occurred by bringing something charged closer. Both the PVC rod charged negatively, and the glass rod charged positively attracted the ball. This was because the polystyrene balls were insulators. Their electrons of molecules nearest the outer surface move partially. If there is something charged near the rods, the side of opposite charges to the rods of molecule attracted and turn to the direction of surface.

From ① and ③, the experiment using the aluminum coated ball, Induction occurred by bringing something charge closer. Both the PVC rod charged negatively, and the glass rod charged positively attracted the ball. This was because aluminum coated balls were conductor. They had more free electrons to move. When something charged approach them, the electrons in the object with smaller electronegativity move to the object with higher electronegativity. Therefore, aluminum coated ball and rods attracted.



This figure
is very good! 2

[Lab 2-a] Reaction between two charged insulators

[Lab 2-b] Reaction between a charged and an uncharged insulator

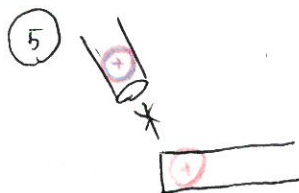
Results:

			Charged Side	Uncharged Side
①	PVC rod Charged with Rabbit Fur (-)	Ebonite Rod with rabbit Fur (-)	Repel	Attract
②	PVC rod Charged with Rabbit Fur (-)	Glass Rod with Silk	Attract	Attract
③	Acryl Rod Charged with Silk (+)	Glass Rod with Silk	Repel	Attract
④	Acryl Rod Charged with Silk (+)	Ebonite Rod with Rabbit Fur	Attract	Attract
⑤	Acryl Rod Charged with Rabbit Fur (=)	Ebonite Rod with Rabbit Fur	Attract (We did this many times)	Attract

Discussion:

We could see the differences in reactions of charged and unchanged object. We were able to see polarization, which happens when a charged object is brought near another object, one charge, either positive or negative, is on one side of an atom. Objects with the same charge repelled. We thought the 4th experiment of Charged side going to repel but the two objects attracted. The acryl rod charged with Rabbit Fur might be negative charge.

Charged side



Uncharged side



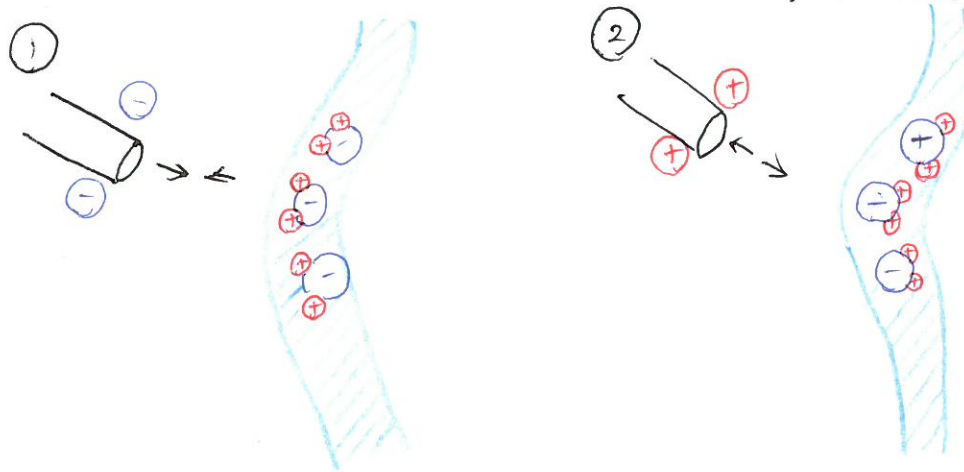
[Lab 2-b] Reaction between a charged insulator and water

Results:

Charged PVC w/Fur	Water	Attract ①	Charged Glass w/Silk	Water	attract ②
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Discussion:

Polar bonds contained in the water molecules can be attracted by either sides, positive or negative.



[Lab 2-c] Reaction between a charged insulator and a conductor(metal)

Results:

Charged PVC w/Fur (-)	suspender	attract ①	Charged Glass w/silk(+)	Suspender	attract ②
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Discussion:

The free electrons in the conductor (suspender) can be attracted by both charges, negative or positive because of electrostatic induction.

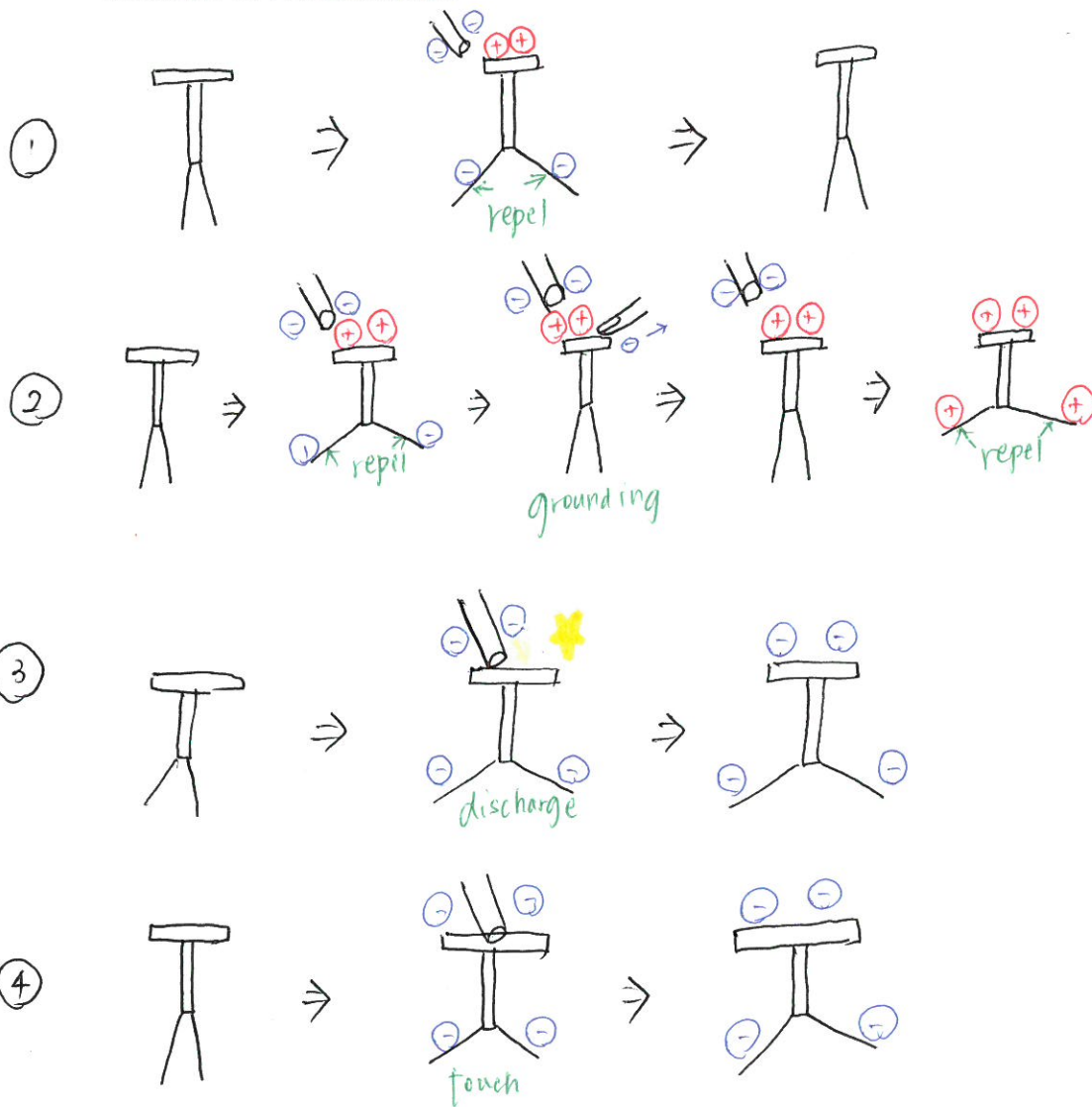


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[Lab 3] Leaf Electroscope

Results & Discussion:



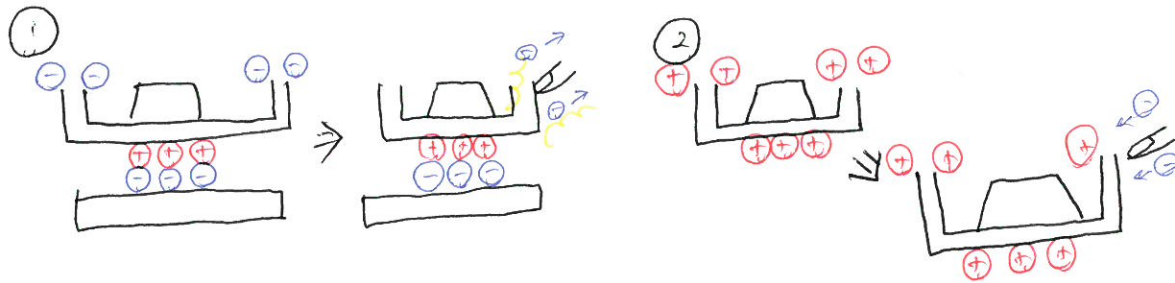
[Lab 4-a] Tray generator

Results:

On both times grounding the experiment, we felt a little shock. Movement of electrons were observed and confirmed.

Discussion:

By rubbing the tissue in the Styrofoam wrapped with saran wrap, friction occurred, and the saran wrap becomes charged negatively. By bringing the tray, the positive free electrons within the tray are attracted to the bottom, while negative electrons escape through the hand, creating a shock. After separating, the tray is now charged positively throughout without the negative electrons. By grounding the tray for the second time, the remaining positive electrons flow through the hand.



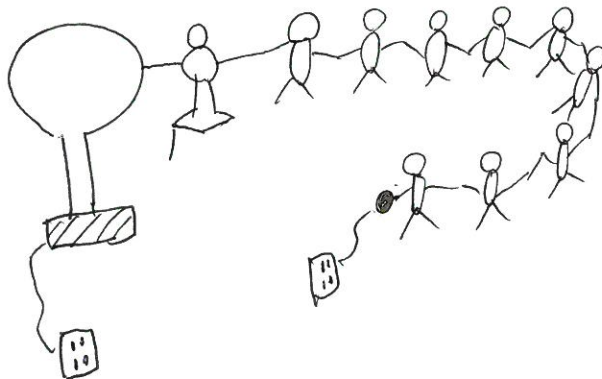
[Lab 5-1] Van de Graaff Generator

Results:

The person nearest the person on the insulation stool felt the shock most. Others also felt shock but it was not so big shock as the first person's one.

Discussion:

People are made by atoms and it is made by electrons, protons and neutron. Our body is conductor so, there are many electrons in our body, and they are moving freely. Intensity of Current flow from the person who is touching the Van de Graff Generator and go through the other's body and released through the grounding.



Conclusion:

In experiment, we could observe the reaction of electric charges. There were three types of reactions related to them. Those were polarization, induction, and the movement of charges. Polarization and Induction were similar, but Polarization occurred with neutral insulators on the other hand, induction occurred with a neutral conductor. Because the static electricity occurs in daily life, it was interesting to know about how it happens.

A red handwritten signature, possibly reading 'Jolii', is written in a cursive style.

Reference:

Airi Kinoshita, Lilika Okuda