

DETERMINATION OF PERIODIC TRENDS OF THE PERIODIC TABLE

INTRODUCTION

In 1912, Moseley summarized the properties of the elements with relation to their atomic number in a law which states, the properties of the elements are a periodic function of their atomic numbers. Eventually, it led to a discovery in trends in the Periodic Table that are used in today's sciences.

PURPOSE

In this lab, you will study the relationship between the atomic numbers of the elements and some of their physical properties. Each will be graphed and trends discussed.

PRE LAB QUESTIONS

- Please define the following words:
 - atomic number.
 - atomic radius
 - ionization energy.
 - electronegativity.
 - element.
 - period.
 - group.
 - trends.

PROCEDURE

You will have six graphs for this laboratory activity. There will be three graphs for the Group Trend and three graphs for the Period Trends.

- For the following data, graph
 - Graph 1: The elements on the x-axis and the atomic radius on the y-axis.
 - Graph 2: The elements on the x-axis and the 1st ionization energy on the y-axis.
 - Graph 3: The elements on the x-axis and the electronegativity on the y-axis.
- Connect the dots for each graph to show the trend.

Element	Atomic Radius (pm)	1 st Ionization Energy (kJ/mol)	Electronegativity
H	53	1312	2.1
He	31	2372	0
Li	167	520	1.0
Be	112	899	1.5
B	87	801	2.0
C	67	1086	2.5
N	56	1402	3.0
O	48	1314	3.5
F	42	1681	4.0
Ne	38	2081	0
Na	190	496	0.9
Mg	145	738	1.2
Al	118	578	1.5
Si	111	787	1.8
P	98	1012	2.1
S	88	1000	2.5
Cl	79	1251	3.0
Ar	71	1521	0

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PROCEDURE FOR GROUP TREND

- For the following data, graph
 - Graph 1: The element on the x-axis and the atomic radius on the y-axis.
 - Graph 2: The element on the x-axis and the 1st ionization energy on the y-axis.
 - Graph 3: The element on the x-axis and the electronegativity on the y-axis.
- Connect the dots for each graph to show the trend.

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CONCLUSIONS

- Based on your graphs, what is the trend for a period in the Periodic Table of Elements for:
 - Atomic radius
 - Ionization energy
 - Electronegativity
- Based on your graphs, what is the trend for a group in the Periodic Table of Elements for:
 - Atomic radius
 - Ionization energy
 - Electronegativity
- What are the names of the elements?
- What period is each element located on the Periodic Table?
- What group is each element located on the Periodic Table?

FINAL ANALYSIS

- Explain in 3-4 paragraphs the organization and usefulness of the modern periodic table based on what you have learned in class and what you have learned from this activity.