

# CHEMISTRY

## Lab 17: Trends in Atomic Radius and Ionization Energy

### Purpose:

Use Excel to determine the relationship between atomic radius and ionization energy. This lab just works with data entry and graph generation. We will use this data to refine the graph and draw conclusions about atomic radii and ionization energy.

### Procedure:

1. Open an Excel workbook
2. In cell A2 enter the text "Symbol"
3. In cell B2 enter the text "Atomic number"
4. In cell C2 enter the text "Atomic Radius"
5. In cell D2 enter the text "Ionization Energy"
6. Enter the data in the data table below
7. Enter the atomic number of each element
8. Select columns B, C, D including titles
9. Click on the chart button
10. Select the Line and the chart that shows markers displayed with each data value
11. Click Next
12. Look at the graph to ensure it shows what you want and click Next
13. Give the graph a title and label your axes as appropriate
14. Click Next
15. Make this an object in your sheet
16. Click Finish
17. Save your file as "xxx\_y\_periodictytab" where xxx is replaced with your initials and y is your period
18. Go to the analysis section and answer the questions about this graph

**Data:**

Symbol	Atomic Radius	Ionization Energy
H	0.79	13.598
He	0.49	24.587
Li	2.05	5.392
Be	1.40	9.322
B	1.17	8.298
C	0.91	11.26
N	0.75	14.534
O	0.65	13.618
F	0.57	17.422
Ne	0.51	21.564
Na	2.23	5.139
Mg	1.72	7.646
Al	1.82	5.986
Si	1.46	8.151
P	1.23	10.486
S	1.09	10.36
Cl	0.97	12.967
Ar	0.88	15.759
K	2.77	4.341
Ca	2.23	6.113
Ga	1.81	5.999
Ge	1.52	7.899
As	1.33	9.81
Se	1.22	9.752
Br	1.12	11.814
Kr	1.03	13.999
Rb	2.98	4.177
Sr	2.45	5.695
In	2.00	5.786
Sn	1.72	7.344
Sb	1.53	8.641
Te	1.42	9.009
I	1.32	10.451
Xe	1.24	12.13

**Analysis:**

1. Examine the graph carefully and describe the general trends in atomic radius.
2. Describe the general trends in ionization energy.
3. How easy is it to see trends and the “Atomic Radius” graph? Why is it so compressed compared to the ionization energy line. List possible solutions for providing more detail in the atomic radius line.
4. We want to be able to compare ionization energy and atomic radii, would it be possible to do this if they were on different graphs?