

Bonding Worksheet

We are going to estimate the covalent Bond Strength of a bond between atoms A and B using the following technique:

$$\text{Bond Strength A-B} = \frac{(\text{Bond Strength A-A} + \text{Bond Strength B-B})}{2}$$

As you can see this is simply finding the average of two bond strengths. The bond between atoms A and B is a heteronuclear bond, it is a bond between two different types of atoms. The bond between atoms A and A along with the bond between atoms B and B are called homonuclear bonds, they are bonds between two of the same kinds of atoms. Remember these terms, they will appear again later.

Record the results of your investigations in the table below. Do ten different pairs of homonuclear bonds and then make sure that you answer the follow-up questions below.

Homonuclear Bonds Selected	Estimated Bond Strength	"Real" Bond Strength	% Difference	Difference in Electronegativities

Follow-up Questions:

1. As you look at all the data above, it may pay to focus on the last two columns (% difference and difference in electronegativity). Do you detect a trend? Why not make a graph of your data with % difference on the y-axis and difference in electronegativity on the x-axis.
2. Looking at the graph that you created, develop a verbal statement that describes the trend seen in the graph.
3. Your graph should now be tested for predictive ability. Select five pairs of homonuclear bonds that you have not previously investigated (record these in the table above). Consult your text or another reference for the electronegativities of these elements and calculate the difference in electronegativity for the selected elements (record these in the table above). Based on this number, use your graph to predict the % difference for the estimates of these bond strengths (record these in the table above). Now test your predictions by using the web page (record your results). Comment on the predictions.