The Entropy of the Chemical Elements

The activity involves exploring the behavior of the entropy of the elements on the periodic tables. We will examine behavior in both groups and periods. To complete this activity, you will need the interactive Excel spreadsheet or Excelet that is available at http://academic.pgcc.edu/~ssinex/excelets/PT_interactive_3.xls.

Go to the “elements I” tab and examine the trend of entropy for most of the elements for atomic numbers 1 to 88. How would you describe the trend across the periods (ie. - what causes the large spikes?)?

To make the examination of elements easier, let’s examine only the elements that are solids in their standard state at 25°C. Click on the “elements II - solids” tab which illustrates the solid elements in periods 2 to 7. In general, how does entropy vary as atomic number (atomic mass) increases?

How do the d group elements behave? Notice you can highlight them by checking the box.

How do the f group elements behave?
You can also examine the behavior on the “elements II - solids in 3D” tab, which shows a three dimensional bar graph.

In general what happens to the entropy as a solid to a liquid and then to a gas? Where would you estimate liquids on this entropy scale?

Now go to the “phase change” tab and examine the entropy of the group 1A and 2A elements in their solid, liquid, and gas phases. Now where would you estimate liquids on this entropy scale?

On the basis of the structures of solids, liquids, and gases, does this make sense? Explain why or why not.

Go the “assess” tab and complete the task to address the question: Does the atomic size of the solid elements influence entropy? Attach your graph and analysis with this activity.