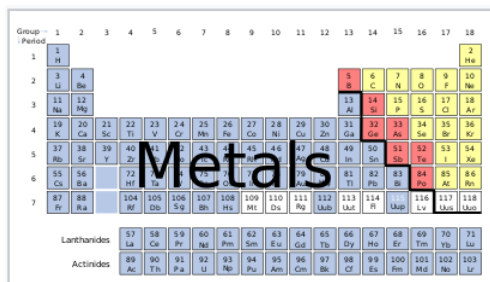


6.1: Prelude to Metals and Alloys

In the chemistry of molecular compounds, we are accustomed to the idea that properties depend strongly on structure. For example we can rationalize the polarity of the water molecule based on its shape. We also know that two molecules with the same composition (e.g., ethanol and dimethyl ether) have very different properties based on the bonding arrangements of atoms. It should come as no surprise that the properties of extended solids are also connected to their structures, and so to understand what they do we should begin with their crystal structures. Most of the metals in the periodic table have relatively simple structures and so this is a good place to begin. We will see in Chapter 8 that the structures of more complex compounds are also in many cases related to the simple structures of metals and alloys.



The image shows a standard periodic table of elements. The word "Metals" is written in a large, bold, black font across the center of the table, specifically over the groups 1 through 10 and periods 4 through 7. The periodic table includes element symbols, atomic numbers, and group/period labels. The lanthanides and actinides series are shown at the bottom.

Over 2/3 of the elements in the periodic table exist in their pure form as metals. All elemental metals (except the three - Cs, Ga, Hg - that are liquid) are crystalline solids at room temperature, and most have one of three simple crystal structures.

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