

Metal Analysis

Just as one can identify a liquid by its properties, one can also identify a metal by how it behaves. Of course we can not really use smell as a method of identification with a metal, but instead we can use how it reacts with other substances. We can not look at all of the metals. There just is not time. Forensic scientists may use many of these same techniques when they have to identify a metal found on a victim or a suspect. Many times they use these techniques in cases of hit and run drivers. Forensic scientists also have more sophisticated techniques available to be sure they have correctly identified the metal. Some metals are alloys, which means that they were melted to their liquid state and then two or more different metals were mixed together. When the alloy cools, it is actually a metal that has some of the properties of all the metals that were mixed together to make up the alloy. The properties of the alloy will be different depending on the proportions of the various metals mixed. Then it is important to find out, not only what the metal is, but the proportions of the metals that made up the alloy. Unfortunately this is very time consuming and we just do not have the time to do it.

What we are going to do is determine how a metal looks, how it reacts to a magnet, and how it reacts to Hydrochloric Acid. The metals we will be investigating are Iron, Zinc, Aluminum, and Tin. Then we will fill out another flow chart with our observations and determine what an unknown metal is.

1. Observe the metal-write down your observations
2. Observe what happens to the metal when a magnet is brought near it. If the material is affected by a magnet, you do not need to do any further tests on it. It is iron!
3. Observe what happens when you put a drop of HCl on it. Does it start to fizz right away, or is it a delayed reaction?

Here is a chart similar to what you will fill out. Do Your observations match the charts?

Metal	Observations	Magnetic?	Water	HCl
Aluminum	Gray, Dull, sometimes shiny	No	No Reaction	Delayed reaction
Copper	Yellow or Brownish	No	No Reaction	No Reaction
Iron	Dark	Yes	No Reaction	Delayed reaction
Magnesium	Dull, Light metal	No	Delayed Tiny bubbles	Immediate violent reaction
Tin	Yellowish tinge	No	No Reaction	Little if any reaction
Zinc	Shiny, Dense(heavy) metal	no	No Reaction	Immediate violent reaction

Or another way to look at the problem is with a decision chart. For metals the chart would look like this:

