

## Mineralogy Boot Camp Session #3

### *Physical Properties of Minerals: Part 1*

Learning to identify minerals relies on recognizing their particular set of physical properties. The properties commonly used for this purpose are going to be described in these next three sessions of Mineralogy Boot Camp. Typical mineralogy handbooks will have these properties listed for individual minerals, and often will include tables of properties arranged to assist in the identification process. Best practice is to base your identification on *several* properties, not just on one property.

### **Color**

The color of a mineral is often the first thing people notice, because it can be observed before ever picking up the specimen. Unfortunately, very few minerals have a consistent, reliable color making the identification easy. The green of malachite, deep blue of azurite, yellow of sulfur, and red of realgar allow these minerals to be easily identified. Most minerals, however, can occur in a *range* of colors depending on the presence of small amounts of impurities or defects in their atomic structure. Quartz is notorious for occurring in nearly every color imaginable. Figure 1 is an example of a few of the color variations found in calcite. Color can be useful in mineral identification, but it's not often unique.

#### ***User notes:***

If a specimen has been exposed to weathering, always look for a fresh surface (or create one by knocking off a small piece, if possible) in order to have a better idea of the color. One common mistake made by novice mineral identifiers seeking to identify a certain specimen is to thumb through a mineral handbook, trying to match the color they observe with the photos in the book. A better technique is to note the color of the specimen and move on to determining more reliable physical properties, such as those described below and in the next two Boot Camp sessions. The color may become more useful once you've narrowed the list of potential suspects to just a few.



Figure 1. These specimens represent some of the various colors of the mineral calcite. Blue-white calcite in upper left is 5.0 inches wide (collection location unknown). Red calcite in upper right is from Lei Ping Mine, Hunan Province, China. Cream-white calcite in lower left is from New Mexico. Clear calcite in lower right (from Iceland) is relatively pure, whereas the other three contain low levels of contaminants giving each a different color. [Note: all specimens in photos for this session and following sessions are from author's collection unless otherwise indicated.]

## Streak

This is the name applied to the color of the powdered form of the mineral. The standard technique to obtain a streak is to rub the mineral on a piece of unglazed porcelain, commonly called a *streak plate*. (Think of the back side of a piece of bathroom tile.) Streak plates are available for purchase in the IMMIG Gift Shop. The advantage of using the streak is that its color is often more reliable than the overall color of the specimen. An example is the mineral hematite, where no matter what color the specimen of hematite, its streak is always a distinctive reddish-brown.

### ***User notes:***

Usually streak is most useful for minerals that are non-white (see Figure 2), because most white to light grey minerals leave a white to light grey streak. Realize also that if the mineral is harder than the streak plate, it will scratch the plate (sometimes leaving a white powder from the plate) rather than leave a trail of mineral powder. A good check on this is after streaking a mineral on

the plate, use one finger to try to rub off a small part of the resulting streak; if it comes off, it's a true streak whereas if it doesn't come off, you've probably scratched the streak plate itself (leaving a gouge in the plate and potentially some plate powder) and so the mineral is harder than the plate. In this case, the information you got about the mineral's hardness is probably more useful than whatever streak color it may have.

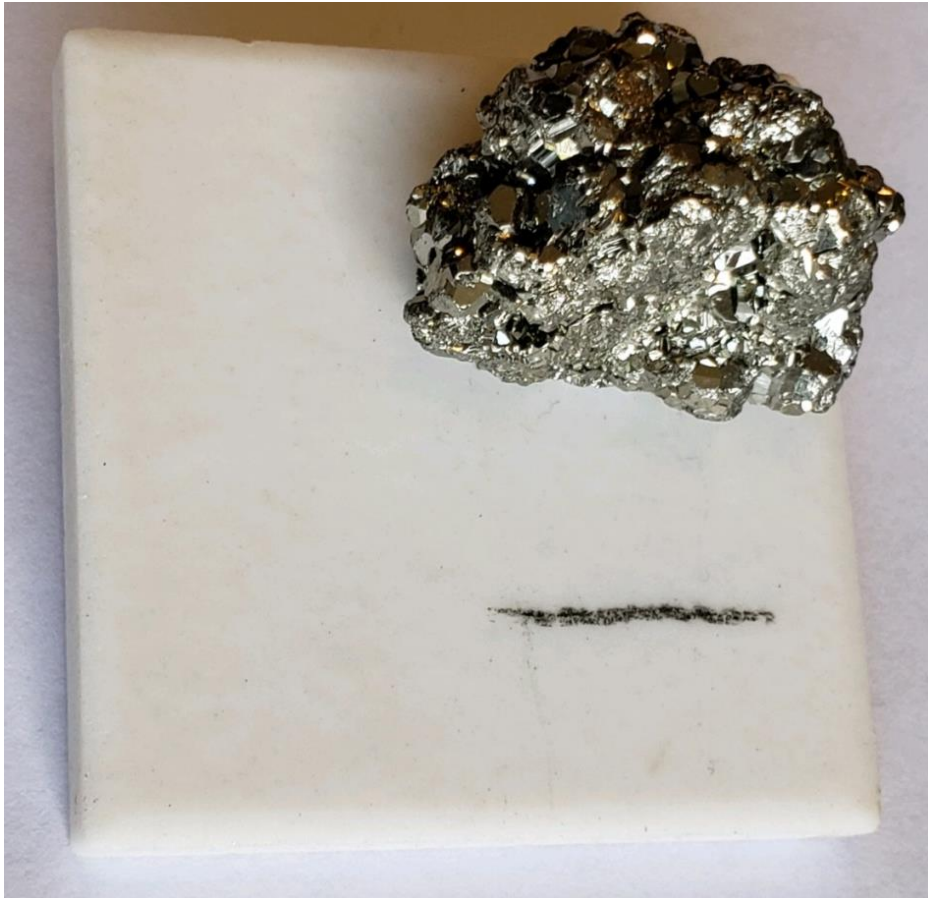


Figure 2. Although pyrite frequently has a yellow-gold metallic appearance, its streak is typically a greenish-black when tested on a streak plate. Streak plate is 1.9 inches on each side.