**Ge 114**

**Hand Specimen Lab Exercise 7**

Low Temperature I

**Items in bold type will be written up and handed in as part of the lab report.**

Goals:

* Learn about biominerals and low-temperature silica polymorphs
* Identify 11 low-temperature minerals
* Differentiate carbonate minerals

I) The minerals to be studied in this lab are:

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*Manganese oxides*: Pyrolusite Romanechite

*Low-T forms of SiO2*: Chalcedony Agate Opal Chert/Jasper

*Carbonates*: Calcite Aragonite Dolomite Azurite

Malachite

Plus one mineral of your choice from the collection, not on this list

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**Prepare a brief written description of your characterization of these minerals, in the form of a table. This table should include the following:**

- Mineral name, formula

- Physical properties and attributes such as: cleavage or fracture, crystal form or habit, luster, color, density to the hand, and possibly magnetism, taste, and other properties if relevant.

- Indicate the three most important diagnostic properties of each mineral.

- Include variations in these properties among different specimens of the same mineral in the Dana and working collections.

- Geological occurrences (rock types) and economic importance.

II) Opal

Compare the electron microscope photographs of gem opal and ordinary white opal taken at high magnification. **Record your observations. Why does gem opal show beautiful rainbow colors while ordinary opal lacks this desirable trait?**

III) Calcite

i) Find a large cleavage rhomb of calcite of suitable transparency and observe the image of some writing through the calcite. **What do you see? Explain this phenomenon.**

ii)The HCl test: **Write down the chemical reaction that would take place between calcite and an acid** (see Klein for help). Add a drop of dilute HCl to samples of calcite and dolomite from the working collection and **observe and record the differences between the reactions**. Now scratch the surface of each mineral and **record your observations of these reactions. Does aragonite react with dilute HCl? If you were in the field, how could you determine if a massive marble unit was made up of calcite or dolomite, or both minerals?**

Other carbonates, phosphates, and silica polymorphs are in the Dana Collection. You may examine these as your time allows and interests dictate!