**Ge 114**

**Hand Specimen Lab Exercise 8**

Low Temperature II

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

Goals:

* Learn about more low-temperature minerals, including evaporites and hydrothermal deposits
* Identify 12 more low-temperature minerals

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

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*Sulfates*: Gypsum Anhydrite Baryte

*Sulfides*: Pyrite Sphalerite Galena Chalcopyrite

*Native element*: Graphite Copper Silver Sulphur Gold

*Borates*: Colemanite

Plus one low temperature 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) **What complex ion is found in the sulfates? In the borates? What about in phosphates or zeolites from earlier labs? How is the bonding within these minerals different from/similar to that in quartz?** (hint: “anisodesmic”)

III) **Which other elements would you be able to find in nature as a mineral (i.e. which elements could naturally be solid and crystalline)? Which element groups would you never expect to find as a mineral? Why do elements like sulphur sometimes exist as a native element and other times form complex ions?** Think about different environmental controls.

Other specimens are in the Dana Collection. You may examine these as your time allows and interests dictate!