**Mineral Cup Project**

**[1] Mineral Basics**

|  |  |
| --- | --- |
| **Mineral name:** |  |
| **Mineral formula:** |  |
| **Polymorphs:** |  |
| **Mineral group:** | e.g., phosphates, oxides, silicates, carbonates |
| **Silicate structural group:** | e.g., tectosilicate, nesosilicate |
| **Solid solution, yes or no:** |  |
| **End member names:** |  |
| **End member formulas / substitutions:** |  |
| **Cation crystal lattice sites present:** | e.g., 2 tetrahedral sites and 1 octahedral site |
| **Model of atomic structure:** |  |
| *Image credit* | (consider using CrystalViewer!) |
| **Number of formula units in unit cell (Z):** |  |
| **Crystal system:** |  |
| **Crystal class (point group) name:** |  |
| **Hermann-Mauguin symbol of the point grp:** |  |
| **Symmetry elements of the point group:** |  |
| **3D block visualization of crystal form:** |  |
| *Image credit* | [mindat website](https://www.mindat.org/article.php/2823/Crystallography%3A%2BThe%2BIsometric%2BSystem) |
| **Image of the mineral exhibiting this form:** |  |
| *Image credit* |  |
| **Color:** |  |
| **Luster:** |  |
| **Streak:** |  |
| **Cleavage and/or fracture:** |  |
| **Habit and/or state of aggregation:** |  |
| **Hardness** |  |
| **Specific gravity:** |  |
| **Twinning:** |  |
| **Other special properties in hand sample:** |  |
| **Most obvious/diagnostic property:** |  |
| **Image of the mineral showing this property:** |  |
| *Image credit* |  |
| **Occurrence - rock type(s)):** |  |
| **Common mineral associations:** |  |
| **Alteration products:** |  |
| **Opaque or transparent:** |  |
| **Relief:** |  |
| **Pleochroism:** |  |
| **Common shapes in cross section:** |  |
| **Image of mineral in plane polarized light:** |  |
| *Image credit* |  |
| **Isotropic or anisotropic:** |  |
| **Birefringence:** |  |
| **Interference color in 30-µm-thick section:** |  |
| **Sign of elongation:** |  |
| **Type and/or angle of extinction:** |  |
| **Uniaxial or biaxial:** |  |
| **Optic sign:** |  |
| **2V angle:** |  |
| **Image of mineral in cross polarized light:** |  |
| *Image credit* |  |
| **Other special properties in thin section:** |  |
| **Societal use of the mineral:** |  |
| **Image of the mineral showing this use:** |  |
| *Image credit* |  |

**How does one identify this mineral in hand sample and thin section?**

This is where you write a paragraph about the best methods for identifying this mineral in hand sample. Synthesize what you’ve learned. You would be unlikely to talk about the streak and specific gravity of plagioclase, for example, because they aren’t very diagnostic. For example, “While plagioclase shares many similar physical properties with other tectosilicates, it is easily recognized by prominent striations on {010}. Certain varieties (Anx–Anx) exhibit labradorescence, which is also diagnostic. If striated faces aren’t visible and the sample is not labradorite, one would next look for [insert relevant properties and discuss].” You could also talk about the occurrence of the mineral, if it’s helpful. For example, you would find kyanite only in metamorphic rocks (you can be more specific of course, whatever is most helpful for identifying your mineral)

 This is another paragraph, now about identifying it in thin section. As above, synthesize your knowledge. Does the mineral typically have square cross sections? Triangles? Is it usually really elongate? Is its color / pleochroism important for identification? Does it have any anomalous interference colors or extinction textures (e.g., “bird’s eye” or “undulatory” extinction)? Consider the order in which you might observe different properties to get the best and also easiest identification (e.g., it’s unlikely that you would try to get the 2V angle first, without making any other observations). Again, consider mineral associations and the rocks you’d expect to find this mineral in, if those things are helpful.

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**[2] Mineral Research**

This is where you will write your five paragraphs about the mineral. Use proper grammar, correct verbiage, and accurate scientific information. Here in the first paragraph, introduce the mineral and lead into your summaries of the three scientific papers.

Here you summarize paper 1. What was the main research question? How did they go about answering it? What did they find? What are the broader implications of the results? Anything else interesting or unusual that you noticed or want to comment on? Transition to paper 2.

Here you summarize paper 2 and then transition to paper 3.

Here you summarize paper 3. Then transition to final paragraph.

In this final paragraph, extend your thinking to talk about what some promising future research directions could be, related to your mineral. What questions were you left wondering after reading the three papers? Could those be good research projects? Why would people care about these potential future research directions? What would be their broader implications? How do they extend and build upon the existing research foundation? Why do you think they could be exciting avenues of research? Show your thoughtfulness, logic, and enthusiasm! *Note, this is based on your reading of these three papers; it’s ok if it turns out that your “future” ideas have actually been studied/implemented elsewhere. I don’t expect you to become familiar with the whole scientific cannon for your mineral.*

**REFERENCES**

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