

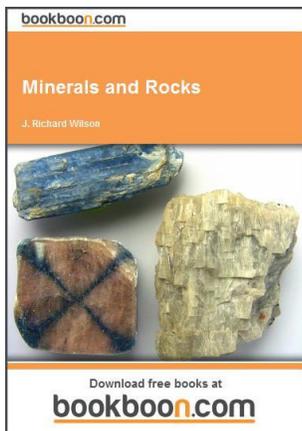


Faculty Review of Open eTextbooks

The [California Open Educational Resources Council](http://www.cool4ed.org) has designed and implemented a faculty review process of the free and open etextbooks showcased within the California Open Online Library for Education (www.cool4ed.org). Faculty from the California Community Colleges, the California State University, and the University of California were invited to review the selected free and open etextbooks using a rubric. Faculty received a stipend for their efforts and funding was provided by the State of California, the William and Flora Hewlett Foundation, and the Bill and Melinda Gates Foundation.

Textbook Name:

Minerals and Rocks



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Textbook Authors:
 J. Richard Wilson

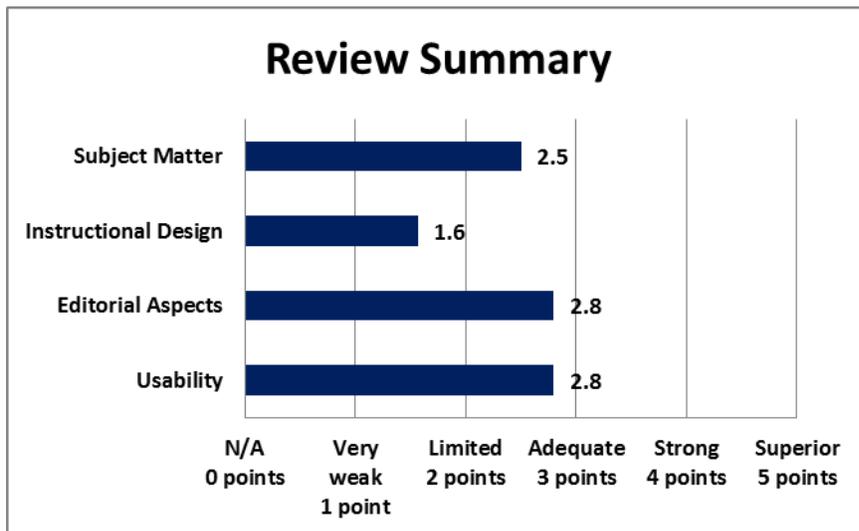
Reviewed by:
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Title/Position:
 Professor

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Date Reviewed:
 December 2015

California OER Council eTextbook Evaluation Rubric

CA Course ID: [GEOL 100](#)

| Subject Matter (30 possible points) | N/A (0 pts) | Very Weak (1pt) | Limited (2 pts) | Adequate (3pts) | Strong (4 pts) | Superior (5 pts) |
|---|-------------|-----------------|-----------------|-----------------|----------------|------------------|
| Is the content accurate, error-free, and unbiased? | | | X | | | |
| Does the text adequately cover the designated course with a sufficient degree of depth and scope? | | | X | | | |

| | | | | | | |
|--|--|--|---|---|---|--|
| Does the textbook use sufficient and relevant examples to present its subject matter? | | | X | | | |
| Does the textbook use a clear, consistent terminology to present its subject matter? | | | | X | | |
| Does the textbook reflect current knowledge of the subject matter? | | | X | | | |
| Does the textbook present its subject matter in a culturally sensitive manner? (e.g. Is the textbook free of offensive and insensitive examples? Does it include examples that are inclusive of a variety of races, ethnicities, and backgrounds?) | | | | | X | |

Total Points: 15 out of 30

Please provide comments on any aspect of the subject matter of this textbook:

The following comments are grouped by text section:

- **Section 1.1**

The author oversimplifies the relationship between rock texture (e.g., crystal size) to magma cooling rate. Perhaps it would be better to relate the crystal sizes/distributions in igneous rock to "solidification rate" instead of "cooling rate". Crystal sizes in igneous rocks are related to the degree to which magma exists below the liquidus temperature(s) of mineral constituents, but (1) reduction of pressure during ascent and eruption in the absence of cooling will also favor nucleation over growth of crystals (and solidification) due to a rising solidus temperature as volatiles are exsolved, and (2) basalts commonly have a much more coarse-grained groundmass than obsidian because of melt viscosity, not because obsidian melts "cooled" faster and basalts "cooled" slower. If anything, the opposite would be more true.

- **Section 1.3**

I think it would be more clear if the concept of "recrystallization" was introduced here instead of using the term "break down" for both weathering and metamorphically induced recrystallization. And, I think a clear definition of what metamorphism is would be helpful.

- **Section 1.4**

The formation of migmatites can be challenging for introductory geology students to understand, but saying that metamorphism can be so intense that rocks will melt into igneous rocks will be confusing to introductory students, as they will think that the partial melting of rock is a form of metamorphism. I think this wording could be more clear and state that partial melting - the formation of melts - represents the upper limit (transition?) of metamorphism. Figure 1.1 could be much more descriptive and effective.

- **Section 2.2**

I think we are expecting too much of an introductory student if we expect that they will understand the concept of crystal habits without visual aids. A figure of these habits would be necessary. And, too little attention is given as an explanation of the origin of mineral properties. For example, why do some minerals possess cleavage planes and some do not? Student need to know why these properties express themselves the way they do, even if only in a simplified sense.

- **Section 4.1.1.1**

Defining the concept of solid solution and compositional endmembers in olivine is very important, and allows you to specify that forsteritic olivine - not "olivine" - crystallizes from a basaltic melt. Fayalitic olivine is common in rhyolites. And, providing liquidus temperatures of olivine end members is great, but you need to state that these are the liquidus temperatures at atmospheric pressure - not in the mantle or deep lithosphere.

- **Section 4.1.5.1**

Combining the terms metamorphic alteration could be confusing to geology students. Its best to keep these two processes separate, whereas alteration is used when describing weathering processes, metamorphism is used when describing >200C recrystallization.

- **Section 4.1.6.2.2**

I don't see an explanation of why there are not K-Ca intermediates in the feldspar family. This should be explained if it is not in the book.

- **Section 4.2.5.1**

The text states that calcite forms in many igneous rocks, but this should be clarified because although calcite may precipitate on/within igneous rocks as a product of hydrothermal alteration after an igneous rock forms, it is only a primary igneous mineral in very rare instances.

- **Section 5.1.1**

This section is overly complex. Rather than providing an opportunity for students to use the different igneous (plutonic) rock classification ternary diagrams to name rocks based on the mineral proportions they see, the author provides a long series of recipes for names that students will have to sort out. I would prefer to teach students (1) how to identify minerals and (2) how to use the lever rule to plot normalized ratios of those minerals on the appropriate ternary.

- **Section 5.3.1**

Explosivity of magmatic eruptions is controlled to a greater extent by magma ascent rate than magma composition, which is a tremendous discovery that has occurred over the past few decades. The threshold for explosive/effusive eruptions (fragmentation) hovers around an ascent rate of ~2 cm/sec, above which magma will fragment and below which magma will erupt effusively. This should be clarified in the text.

- **Section 5.4.2**

This section needs to be updated in light of scientific progress on our understanding of caldera formation over the past 2 decades. Subvolcanic magma chambers are no longer thought to empty during eruptions, but rather the plastic/ductile margins of the magma reservoir contract as a result of reduced pressure via eruption of overpressurized magma, resulting in either the sealing of the conduit and stopping of the eruption or pulling the roof rock into the reservoir, triggering caldera formation.

- For books like this that focus so specifically on identifying, classifying, and interpreting rocks and minerals, it should have an atlas of high quality images showing a variety of different rocks and minerals from hand sample to outcrop scale.

| Instructional Design (35 possible points) | N/A (0 pts) | Very Weak (1pt) | Limited (2 pts) | Adequate (3pts) | Strong (4 pts) | Superior (5 pts) |
|---|----------------|--------------------|--------------------|--------------------|-------------------|---------------------|
| Does the textbook present its subject materials at appropriate reading levels for undergrad use? | | | X | | | |
| Does the textbook reflect a consideration of different learning styles? (e.g. visual, textual?) | | X | | | | |
| Does the textbook present explicit learning outcomes aligned with the course and curriculum? | | X | | | | |
| Is a coherent organization of the textbook evident to the reader/student? | | | X | | | |
| Does the textbook reflect best practices in the instruction of the designated course? | | | X | | | |
| Does the textbook contain sufficient effective ancillary materials? (e.g. test banks, individual and/or group activities or exercises, pedagogical apparatus, etc.) | X | | | | | |
| Is the textbook searchable? | | | | X | | |

Total Points: 11 out of 35

Please provide comments on any aspect of the instructional design of this textbook:

- The design of the book is extremely simplified - virtually all concepts are portrayed in text with variably effective sketches. A book like this, with such a narrow focus on mineralogy and petrology - should have more illustrations, photographs, and concept-sketches that allow the student to engage more fully.

| Editorial Aspects (25 possible points) | N/A (0 pts) | Very Weak (1pt) | Limited (2 pts) | Adequate (3pts) | Strong (4 pts) | Superior (5 pts) |
|---|----------------|--------------------|--------------------|--------------------|-------------------|---------------------|
| Is the language of the textbook free of grammatical, spelling, usage, and typographical errors? | | | | | X | |
| Is the textbook written in a clear, engaging style? | | | | X | | |

| | | | | | | |
|---|--|---|--|--|---|--|
| Does the textbook adhere to effective principles of design? (e.g. are pages laid out and organized to be clear and visually engaging and effective? Are colors, font, and typography consistent and unified?) | | | | | X | |
| Does the textbook include conventional editorial features? (e.g. a table of contents, glossary, citations and further references) | | | | | X | |
| How effective are multimedia elements of the textbook? (e.g. graphics, animations, audio) | | X | | | | |

Total Points: 14 out of 25

Please provide comments on any editorial aspect of this textbook:

- The text is written in a plain and straightforward manner, as are the illustrations. This is a no frills text, much of it would be used purely as a reference as opposed to a textbook.

| Usability (25 possible points) | N/A (0 pts) | Very Weak (1pt) | Limited (2 pts) | Adequate (3pts) | Strong (4 pts) | Superior (5 pts) |
|---|-------------|-----------------|-----------------|-----------------|----------------|------------------|
| Is the textbook compatible with standard and commonly available hardware/software in college/university campus student computer labs? | | | | X | | |
| Is the textbook accessible in a variety of different electronic formats? (e.g. .txt, .pdf, .epub, etc.) | X | | | | | |
| Can the textbook be printed easily? | | | | | | X |
| Does the user interface implicitly inform the reader how to interact with and navigate the textbook? | | | | X | | |
| How easily can the textbook be annotated by students and instructors? | | | | X | | |

Total Points: 14 out of 25

Please provide comments on any aspect of access concerning this textbook:

- Due to the simple design and absence of photographs, students can easily annotate and print.

| Overall Ratings | Not at all (0 pts) | Very Weak (1 pt) | Limited (2 pts) | Adequate (3 pts) | Strong (4 pts) | Superior (5 pts) |
|--|--------------------|----------------------------|-----------------------------|------------------|--------------------------|----------------------------------|
| What is your overall impression of the textbook? | | | X | | | |
| How willing would you be to adopt this book? | Not at all (0 pts) | Strong reservations (1 pt) | Limited willingness (2 pts) | Willing (3 pts) | Strongly willing (4 pts) | Enthusiastically willing (5 pts) |
| | | X | | | | |

Total Points: 3 out of 10

Overall Comments

If you were to recommend this textbook to colleagues, what merits of the textbook would you highlight?

- This textbook might be good to have posted on a learning management system class page (e.g., Moodle, Blackboard) or as a couple hard copies printed out in the laboratory classroom where a rocks and minerals class lab meets for reference due to its description of minerals and rocks, but the petrology aspects of the book are not as thorough or up-to-date in terms of our current scientific understanding than other books I've seen.

What areas of this textbook require improvement in order for it to be used in your courses?

- Comments from my review would need to be addressed
- More interactive illustrations
- More (lots more) high quality (macro) images of rocks and minerals
- Modernizing the explanations in light of recent scientific discoveries made on many of the topics discussed in this book.

We invite you to add your feedback on the textbook or the review to the [textbook site in MERLOT](#) (Please [register](#) in MERLOT to post your feedback.)



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