

Study Questions: Igneous Rocks and Processes

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The quiz about matter and minerals will involve questions like the ones that follow.

Note: Whenever you see reference to *Tarbuck*, in the following questions, that means the eText of the textbook by Tarbuck and others, **Earth**

1. In general, is the material in magma entirely in the liquid state?
2. What is magma?
3. What do igneous rocks form from?
4. What is a representative average temperature for basaltic magmas?
5. What is a representative average temperature for silicic magmas?
6. What causes magmas to rise from the area below Earth's surface where they were generated?
7. Igneous rock is divided into two broad categories based on whether it forms below Earth's surface or near/at Earth's surface. What is the name of the category of igneous rock that forms near/at Earth's surface?
8. What is the name of the category of igneous rock that forms below Earth's surface?
9. Are mafic magmas generally hotter or cooler than silicic magmas?
10. Are mafic magmas generally more viscous or less viscous than silicic magmas?
11. Given two magmas extruded onto Earth's surface. Which would be more likely to flow rapidly: a mafic magma or a silicic magma?
12. What feature in the mantle is most commonly associated with active volcanism that occurs in the interior of plates, away from active plate boundaries?
13. What is the descriptive term related to the size, shape and arrangement of minerals in a rock?
14. When the matrix or groundmass that constitutes most of the volume of an igneous rock is composed of grains whose size is small ($< \sim 0.25$ mm), how do we describe its texture?
15. When the matrix or groundmass that constitutes most of the volume of an igneous rock is composed of grains whose size is size is medium to large (> 0.25 mm), how do we describe its texture?
16. When an igneous rock has a grain-size distribution that is bimodal (i.e., contains larger grains embedded in a matrix or groundmass of smaller grains), how do we describe its texture?
17. What is the general interpretation of the cooling rate of an igneous material based on a *glassy* texture?
18. What is the general interpretation of the cooling rate of an igneous rock based on an *aphanitic* texture?
19. What is the general interpretation of the cooling rate of an igneous rock based on an *phaneritic* texture?
20. What is the fine-grained material in a porphyritic rock called?
21. What are the coarse-grained crystals in a porphyritic rock called?
22. Are aphanitic igneous rocks generally *intrusive* or *extrusive*?
23. Are phaneritic igneous rocks generally *intrusive* or *extrusive*?
24. Are glassy igneous materials generally *intrusive* or *extrusive*?
25. What is the origin of a *pyroclastic* texture?
26. Name the rock type: a light-toned igneous rock with a **coarse** average grain size ($> \sim 1$ mm), potassium and plagioclase feldspar, a significant amount of quartz, and some dark minerals.
27. Name the rock type: an intermediate-toned igneous rock with a **coarse** average grain size ($> \sim 1$ mm), plagioclase and maybe some potassium feldspar, maybe some quartz, and up to $\sim 50\%$ dark minerals.
28. Name the rock type: a dark-toned igneous rock with a **coarse** average grain size ($> \sim 1$ mm), plagioclase feldspar, no quartz, and $\sim 35-65\%$ dark minerals (mostly olivine and pyroxene).
29. Name the rock type: a dark-toned igneous rock with a **coarse** average grain size ($> \sim 1$ mm), perhaps some plagioclase feldspar, and at least 90% dark minerals (olivine, pyroxene).
30. Name the rock type: a light-toned igneous rock with a **fine** average grain size ($< \sim 0.25$ mm), potassium and plagioclase feldspar, a significant amount of quartz, and some dark minerals.
31. Name the rock type: an intermediate-toned igneous rock with a **fine** average grain size ($< \sim 0.25$ mm), plagioclase and maybe some potassium feldspar, maybe some quartz, and up to $\sim 50\%$ dark minerals.
32. Name the rock type: a dark-toned igneous rock with a **fine** average grain size ($< \sim 0.25$ mm), plagioclase feldspar, no quartz, and $\sim 35-65\%$ dark minerals (mostly olivine and pyroxene).
33. What kind of rock represents the average composition of the continental crust?
34. What kind of rock represents the average composition of the oceanic crust?
35. What is the term associated with all pyroclastic material ejected from a volcano?
36. What is the name of a rock formed by the accumulation of pyroclastic fragments, often in layers?
37. What do we call an igneous material made of a glassy froth or bubble structure, that floats in water until it is saturated?
38. What kind of magma (mafic or silicic) is associated with the partial melting of the upper mantle?
39. What kind of magma (mafic or silicic) is associated with the partial melting of material in the continental crust, perhaps mixed with other constituents?
40. When the upper mantle is partially melted, and that melt crystallizes, what kind of igneous rock results from that crystallization?