

# Classification and Identification of Igneous Rocks

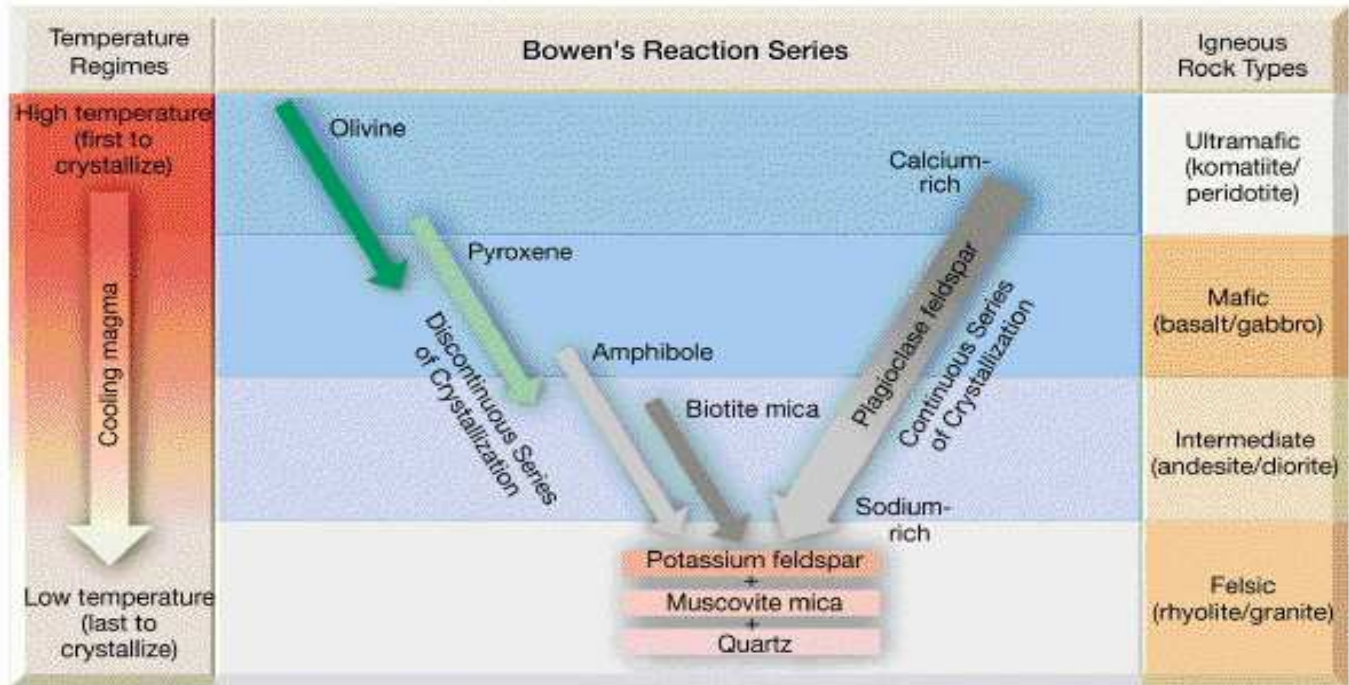


<b>Chemical Composition</b>		<b>Granitic (felsic)</b>	<b>Andesitic (intermediate)</b>	<b>Basaltic (mafic)</b>	<b>Ultramafic</b>
<b>Dominant Minerals</b>		<b>Quartz Potassium Feldspar</b>	<b>Amphibole Intermediate plagioclase feldspar</b>	<b>Pyroxene Calcium-rich plagioclase feldspar</b>	<b>Olivine Pyroxene</b>
<b>Color</b>		<b>Light</b>	<b>Medium</b>	<b>Dark</b>	<b>Dark</b>
<b>T e x t u r e</b>	<b>Phaneritic (coarse grained)</b>	<b>Granite</b>	<b>Diorite</b>	<b>Gabbro</b>	<b>Peridotite</b>
	<b>Aphanitic (fine grained)</b>				
	<b>Porphyritic</b>	<b>"Porphyry" follows any of the above names whenever there are appreciable phenocrysts</b>			
	<b>Glassy</b>	<b>Obsidian (compact glass) Pumice (frothy glass)</b>			

The most useful and significant classification system for igneous rocks is based on two criteria: composition and texture. These criteria are important not only in describing the rock so that it can be distinguished from other rock types, but also in drawing important implications about the rock's origin. The chart above shows variations in composition horizontally and variations in texture vertically. This chart provides an effective framework for classifying and naming igneous rocks.

1. Presence or absence of quartz. Quartz is an essential mineral in felsic rocks, and is an accessory mineral in intermediate or mafic rocks. (in the classification of igneous rocks, an "essential mineral" is a mineral on which the rock classification is based. An accessory mineral occurs in minor amounts and is not a factor in classification.)
2. Composition of the feldspars--Potassium feldspars and sodium Plagioclase are essential minerals in felsic rocks but are rare or absent in intermediate and mafic rocks. Calcium plagioclase is characteristic of mafic rocks.
3. Proportion and kinds of ferromagnesian minerals--As a general rule, mafic rocks are rich in ferromagnesian minerals, while felsic rocks are rich in quartz. Olivine is generally restricted to mafic rocks. Peroxines and amphiboles are present in mafic to intermediate rocks. Biotite is common in intermediate and felsic rocks.

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Bowen's Reaction Series shows the sequence in which minerals crystallize from a magma. Compare this figure to the mineral composition of the rock groups below. Note that each rock group consists of minerals that crystallize at approximately the same time.

