

Name:

Tutor:

Course:

Date:

Pegmatites

Pegmatite Origins

One might ask, “What is a pegmatite?” And the answer to this is, a pegmatite is a rock. This rock has many interlocking crystals that are slightly larger than 3cm in size. They are igneous rock types, mainly associated with granites, which are deep-seated, coarse-grained and deep-formed within the earth’s crust (Web, 2003). Pegmatites have many irregular appearances, shapes, sizes and field relationships. Different theories exist that explain their origin.

Pegmatites are believed to have been formed by intrusion, which is how some dikes show intrusive characteristics. Such types of rock are closely linked to igneous rocks. This is true of rocks that display plutonic crystallization characteristics in the late stages. This leaves the assumption that these rocks are rich in materials such as Sulphur, chlorine, water, phosphorus and fluorine. Sinkankas (1988) explains that these are highly volatile liquids; hence, they react with chemical elements, resulting in ionic sizes that are too big to fit into rock minerals’ crystalline structures. This caused the elements to settle as pegmatite deposits (p.114). The occurrence of pegmatites with plutonic rock compositions proves this theory. These compositions are like Gabbros, Syenites, Anorthosites and Diorites. Other pegmatites show no intrusive relationships as well and may be linked to the elements sweating them during metamorphism at high temperatures and high pressures. Thus, this pushes the rock up as magma, and thereby results in large crystals that are often granitic rocks (Sinkankas, 1988, pp.125–6).

Mineral Components of Pegmatites

Pegmatites often have large, high-quality mineral varieties. A simple pegmatites may contain a few exotic minerals such as Quartz, Mica and Feldspar, while a complex commonly known as 'Rare Earth Elements' contain other minerals such as Beryle, Tungsten, Aquamarine, Cassiterite, Topaz, Tourmaline, Apatite, Tin and Fluorite, in addition to a whole range of other minerals only found in very few countries in the world (Morgan and London, 1999, 136). Other elements such as Bismuth, Uranium, Boron, Sulfide minerals, Radium and Columbium are also attained from pegmatite deposits. The presence of Quartz, Feldspar or pegmatites can be seen by examining float crystal shards with good crystal faces (Morgan and London, 1999, 315–19).

The Economic Value of Pegmatites

Pegmatites are rocks that are considered valuable, mainly because they have gemstones in them, as well as rare earth minerals such as Tungsten, Aquamarine, Topaz, Corundum, Tourmaline, Fluorite and Apatite. Additionally, Lithium's chief source is pegmatites, which is present either as Spodumene, Lepidolite or Lithiophyllite. Technical-grade Lithium is used in manufacturing glass and ceramics. Its chemical-grade is a major component in rechargeable batteries and is used as a lubricant. Granitic pegmatite, which is the most distributed pegmatite mineral in world, contains Potash Feldspar and Quartz. Ceramic industries use these as raw materials. Pegmatic rocks also contain radioactive minerals, such as Uranium, which is used in radiometric rock dating; Tantalum capacitors are used in automobile applications, airbag activation devices, ABS, computers and smart phones. Additionally, Cesium is used in solar photovoltaic cells because of its photo-emissive properties. Cesium formate is designed for high temperature and high pressure drilling for the exploration of petroleum deposits (Deer et al., 1966, 323–5).

Particular Minerals Formed in Pegmatites of Major Interest

The most interesting mineral among the elements of pegmatites is Quartz. In addition, Quartz is the most common mineral found on the earth's, after Feldspar. I believe that it is the most interesting minerals ever discovered. The mineral is abundant in pegmatites as stringers or ledges. The most common type of Quartz appears as milky or cloudy, and the rare type has a glassy appearance. Quartz is used in electrical components, glass, optical lenses, abrasives and building stones. What intrigues me about Quartz is that it is a component of every rock on earth; however, no two specimens of Quartz are alike. This is attributed to the multi-characteristic nature of this fascinating rock. Another amazing characteristic of Quartz is its ability to keep time when used to make watches (Deer et al., 1966, 329–25).

Works Cited

"Pegmatite." World of Earth Science. (2003). *Encyclopedia.com*. Web.

<http://www.encyclopedia.com/doc/1G2-3437800449.html>

Deer, A., Howie, R. and Zussman, J. *An Introduction to the Rock Forming Minerals*, Longman.

(1966).pp. 340–55. Print.

Morgan, B. and London, D. “Crystallization of the Little Three layered pegmatite -aplite dike,

Ramona District, California”. *Contributions to Mineralogy and Petrology*. (1999).

pp.136; 310–30.

Sinkankas, J. *Field Collecting Gemstones and Minerals*, Geoscience Press, Tucson,

Arizona. (1988). pp1110-397.Print.