Skarn

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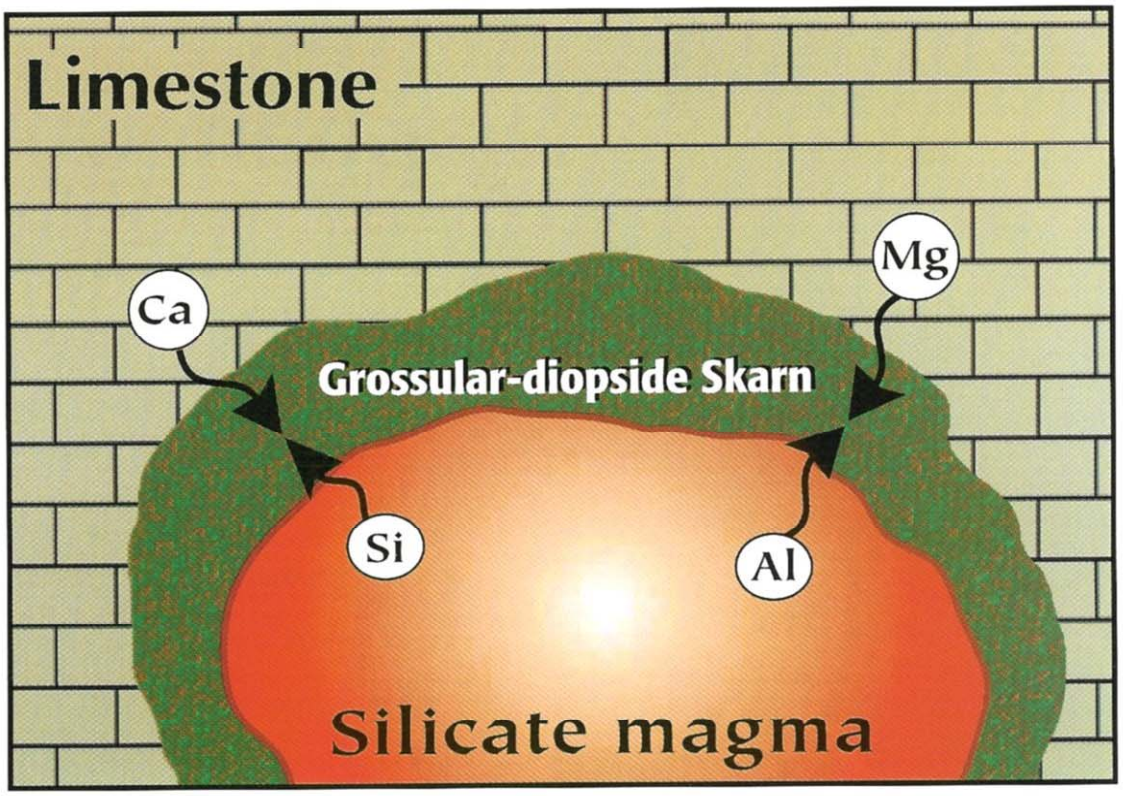

Formation of a "classic" skarn. Heating of the limestone and the addition of silica, aluminum, and other elements from the intruded magma result in the formation of a contact halo with abundant calcium silicate minerals. Redrawn from Robinson and Scovil (1994).

In the last issue of *Rocks & Minerals* I introduced this column with a discussion about igneous pegmatites. In this issue I look at skarn, a metamorphic rock type.

There are numerous definitions and usages of the word *skarn,* many of which have genetic connotations. The problem is that skarns can form by different processes and from different pre-existing rock types (also known as protoliths). Because of this, Einaudi, Meinert, and Newberry (1981) suggest that the term *skarn* be used strictly in a descriptive sense, based on mineralogy and free of genetic interpretations. The most widely accepted use of *skarn* is to describe a metamorphic rock that is composed primarily of calcium silicate minerals, typically dominated by garnet and pyroxene.

Skarns can form during regional or contact metamorphism and from hydrothermal alteration of a pre-existing rock. They are found adjacent to igneous intrusions, along fractures and faults, in shallow geothermal systems, on the bottom of the sea floor, and at lower crustal depths in deeply buried metamorphic terrains (Meinert 1992).

The classic mode of skarn formation involves high-temperature contact metamorphism wherein a silicate magma is intruded into a carbonate-rich sedimentary rock such as a limestone. The limestone in the proximity of the intrusion is baked by the hot magma (contact metamorphism). There is also the addition of elemental constituents from the magma to the limestone (metasomatism)—most importantly the addition of silica—and the potential loss of elemental constituents from the limestone. The silica and calcium combine to form calcium silicate minerals in this high-temperature environment (see fig.).

Skarns can be sources of beautiful mineral specimens and may or may not have economic ore mineralization. Common skarn-forming minerals include garnets, pyroxenes, olivine, pyroxenoids, amphiboles, scapolites, epidote-group minerals, plagioclase feldspars, calcite, quartz, axinite, and vesuvianite. Other minerals may be present depending on the mode of skarn formation, the nature of the intruding magma, and the protolith. Those skarns that do contain ore are designated *skarn deposits* (in reference to ore deposits).

The references listed below are good sources of further information about skarns. There is also a wonderful Web page devoted to skarns, www.wsu.edu:8080/~meinert/skarnHP.html. Developed by Dr. Larry Meinert of Washington State University, it includes a list service and an extensive bibliography.

Dr. John Rakovan, an executive editor of Rocks & Minerals, *is a professor of mineralogy and geochemistry at Miami University in Oxford, Ohio.*

REFERENCES

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