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Pseudomorphs (Latin for "false form") are a varied and interesting group of mineral specimens appreciated by many collectors. Arizona has many localities which have produced pseudomorphs. The most common are the result of alteration in carbonate deposits—azurite to malachite or chrysocholla. Indeed, virtually all of the porphyry copper deposits in the State have produced noteworthy examples of pseudomorphs. Perhaps the best-known are the "Roman sword" malachite after azurite clusters from several mines in Bisbee, notably the Junction and the Cole. A close second are the velvet malachite pseudo-rhombic crystals on tenorite matrix from the New Cornelia mine in Ajo. But there are also numerous examples of azurite altering to malachite from Morenci, from the Silver Hill mine, and many other locales throughout the state. Chrysocolla pseudomorphs after azurite or malachite are also found in copper deposits in Arizona. Some of the best have been found in the oxide zone at Bagdad as the open pit was being developed. These specimens are after azurite crystals up to 4" in length. Excellent examples of chrysocolla after malachite or azurite are also found in Globe-Miami, especially from the Old Dominion mine.

Gypsum replacing Glauberite, Camp Verde, Arizona.

Alteration pseudomorphs can be found in many granitic deposits. Sharply defined specimens of limonite after pyrite have been found at the Belmont mine in Washington Camp/Duquesne, at the Fat Jack mine, at the Willow Springs locale, and many other locales around the State. The Willow Springs deposit is also well-known for alteration of schorl crystals to micaceous pseudomorphs, some to six inches in length. Some pseudomorphs after pyrite are not limonitic, but rather are hisingerite (iron silicate). Testing has been done at the University of Arizona using RAMAN analysis; casual field observation by the author suggests that hisingerite is fairly common throughout Arizona and is often mistakenly identified as limonite.

Pseudomorphs can form as a result of other processes. Perhaps the best-known and most prolific locality is the salt mine near Camp Verde, AZ, which has produced replacement pseudomorhs of selenite and glauberite. These have formed crystals up to three-inch monoclinic crystals in cream, milk-white, tan, or grey color as single, sharp crystals or clusters without matrix.

Quartz over Malachite and Chrysocolla, Live Oak Pit, Old Dominion mine, Globe, Arizona.

Quartz after calcite, South Comobabi Mountains, Pima County, Arizona.

Chrysocolla, Pearl Handle Pit, Ray mine, Arizona. Flagg Mineral Foundation specimen

Arizona also boasts a wide selection of encrustation pseudomorphs, or "epimorphs." Some purists do not recognize these as true pseudomorphs because they do not fit the classical definition of a pseudomorph, namely a molecule-by-molecule replacement of one mineral by another, exactly filling the same volume as the original crystal. Encrustation pseudomorphs

are more like icing on a cake: taking the form of the underlying material but being slightly larger than the original. Quartz perimorphs are found in a number of localities in Arizona, with the original crystal form easily identifiable.

One of the finest localities for quartz perimorphs is found in the South Comobabi Mountains in Pima County. Calcite schalenohedra up to four inches tall are replaced by a fine-grained quartz druse coating. Each of the ridges in one area of the South Comobabis has a characteristic appearance of differing quartz pseudomorphs. While most are white or pale amethystine crusts after scalenohedra, white quartz druses after calcite forming sharp rhombs have also been found. Rarely, quartz casts of cubic fluorite, often forming on top of quartz after calcite specimens are also found.

Another important locality for quartz pseudomorphs was a find made in Duquesne on the ridge between the North and South Belmont mines in 2001 by Paul Harter, Gene Schlepp and Jim Bleess. They were looking for Japan-law twins of quartz when they hit a chain of three large, cave-like vugs. While there were a few quartz twins recovered, the really noteworthy find was a series of quartz clusters with quartz and calcite shoveled onto the dump and abandoned. Following directions from Paul Harter, Don Belsher of Colorado and I located the dig and sifted the extensive dumps. We were able to recover over two flats of pseudomorph specimens.

Perhaps the most alluring find of quartz pseudomorphs has been found at the Piedmont Mine in Yavapai County. These are quartz coatings over pseudo-rhombic malachite and azurite specimens. The crystal surfaces range from fine-grained milky quartz to gemmy quartz points over emerald-green, light green-to-whitish, or dark green, large crystals. Although the legend is that these specimens were out of a single pocket, it is fairly clear to any knowledgeable field collector that several vugs produced the variety of specimens. They are an icon of Arizona pseudomorphs, and perhaps the rarest.

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