

Nucleation vs. syntaxial overgrowth VII: an example in a fractured dolostone

This is the seventh and final page in a series about when nucleation of new crystals does, and does not, happen. Page I introduced the concept, and this is one of six examples.

The photomicrographs below show a dolostone (the brown felt-like background is fine-grained dolomite). A large quartz sand grain is evident in the middle of the image, and a fracture (arrowed) cuts through the rock vertically.

The image on the right is an enlargement of the center of the image on the left. Evident in the enlargement are a few dolomite crystals *in* the quartz grain, documenting that the fracture split the quartz grain as well as the carbonate.

This example illustrates how critical substrates are to mineral precipitation. Where one pre-existing quartz crystal provided a substrate, quartz grew as the mineral-filling fracture. Where dolomite crystals

dolomite crystals provided substrates, *the same solution* precipitated dolomite. Thus substrates and non-nucleation can control the mineralogy of precipitating minerals. The solution precipitating minerals in this fracture was supersaturated with respect to both quartz and dolomite, but we know that only because both minerals were present as substrates in the pre-existing rock.

That thought gets us to one last question:

With respect to how many *other* minerals was the water in this fracture supersaturated, but for which there was no pre-existing substrate?