

MINERAGENCY OF ROCK CRYSTAL AND GRANULAR QUARTZ FROM THE ALDAN SHIELD (EASTERN SIBERIA, RUSSIA)

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Spatially separate veins of rock crystal and granular quartz were found in the western Aldan shield, within the Aldan-Timpton meganticlinorium, which is composed of Archean metamorphic rocks. Productive crystal-bearing fields are localized in blocks of allochthonous sheets of early thrusts, at their intersections with later NE-striking faults. The rocks of these blocks were extensively reworked by fluids, whose compositions changed from predominantly carbon dioxide at early stages to fluoride-chloride water-carbon dioxide at the final stage of quartz crystal formation. Early fault and thrust dislocations resulted in the formation of premineral silicic metasomatic rocks. During later stages, local zones of solutions migration were formed, within which quartz leaching and precipitation as crystal veins took place. The extent of quartz crystal formation was controlled by the thickness of rocks involved in tectonic movements. The veins of granular quartz are confined to the joining zones of the Aldan shield and an activated structure represented by troughs and grabens. The veins occur within the framing of the latter and are, in fact, blastomylonites and blastocataclasites after quartz veins metamorphosed under the greenschist and epidote-amphibolite facies. The highest purity quartz formed under high-pressure metamorphic conditions. In contrast to the crystal-bearing veins, the granular quartz shows no evidence of fluid participation in its genesis.

Thus, the crystal-bearing veins developed in zones of extension and extensive fluid and metasomatic reworking of Archean rocks. The veins of granular quartz originated during the dislocation and high-pressure metamorphic alteration of primary quartz veins in tectonic blocks affected by compression regimes.