Chert Encyclopedia Article

Chert

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Contents

Chert Encyclopedia Article.....1

Contents.....2

Chert.....3

Chert

Chert, or cryptocrystalline **quartz**, is a microcrystalline variety of the mineral quartz (SiO_2) that is chemically or biochemically precipitated from seawater. Chert is just one of the many types, or polymorphs, of quartz, a mineral composed of three-dimensionally bonded silicate tetrahedra. Chert is very fine-grained, so it does not occur as the 6-sided, prismatic **crystals** typical of such coarsely crystalline varieties of quartz as **rock** crystal, amethyst, smoky quartz and citrine. It does, however, have the mineral properties of quartz. It has a glassy, or vitreous, luster, it is number seven on the Moh's scale of hardness, and it breaks along uneven, shell-shaped planes, a property called conchoidal fracture. Other microcrystalline varieties of quartz include chalcedony, agate, onyx and jasper. Dark grey, unbanded chert is better known as flint. Early hunters and warriors exploited chert's characteristic hardness and conchoidal fracture to create sharp-edged, durable tools and weapons; they also discovered that the hard, smooth surface of a flint nodule or shard can be used to strike a spark.

Silica is mainly extracted from seawater by the biochemical actions of marine organisms. Microscopic aquatic plants, called **diatoms**, take in silicate (SiO_4^{4-}) ions from sea-water and use them to create siliceous hard parts, or frustules. When the plants die, the frustules fall to the seafloor, creating layers of uncrystallized siliceous "ooze." Compaction and cementation of these layers of silica creates chert. Opal is solid marine silica that has not yet bonded into a rigid crystal framework. Chert usually occurs as bands or nodules in **limestone**, a marine sedimentary rock that forms by the same mechanism of biological mineral **precipitation**. Organisms like corals and foraminifera, which contribute their hard parts to limestone use calcium (Ca^{2+}) and carbonate (CO_3^{2-}) ions to create their skeletons and shells. Limestone, accordingly, is composed of the mineral calcite ($CaCO_3$) instead of quartz, but like chert, it is a geological remnant of a biologically productive marine environment.

See Also

Calcareous Ooze; Sedimentary Rocks