ROCKS AND STRUCTURE OF THE QUARTZ SPRING AREA pdf

1: For outdoor lovers, Oklahoma rocks

The Quartz Spring area covers about 50 square miles in the northern part of the Panamint Range, Inyo County, California. It lies near the southwestern border of the Basin and Range Province. The paper describes the stratigraphy, igneous petrology, and the main structures of the area. The formations.

At first glance, clear quartz crystals may appear to be similar to a number of other translucent crystalline minerals, but they can usually be distinguished by their hardness and lack of cleavage. Calcite can occur in translucent masses that mimic the appearance of quartz, but the two minerals are easily distinguished by their hardness and the fact that calcite reacts easily with dilute acids. Quartz is much harder than calcite and, unlike calcite, cannot be scratched by most metal implements. Quartz also lacks cleavage, while calcite exhibits excellent cleavage in three directions. Quartz cannot be scratched by most metal implements and does not display any cleavage. When struck, quartz breaks like glass, producing sharp edges and shards. Consequently when examining a specimen, you should only look for broken edges rather than try to create your own! Flourite and amethyst quartz are sometimes confused simply because they both form purple translucent crystals, however the two are easily distinguished by their hardness fluorite has a hardness of 4 and is easily scratched by a nail, while quartz at 7 is harder than a nail , shape fluorite crystals are cubic, while quartz are hexagonal and cleavage. Fluorite exhibits perfect cleavage in four directions to form octahedrons, while quartz lacks any cleavage and breaks by conchoidal fracture. A few varieties of garnet may be confused with rose quartz, and the two minerals have about the same hardness. Quartz, however, does not exhibit cleavage and if a garnet crystal is well formed it will have a distinctive dodecahedral twelve-sided shape. Quartz was the mineral upon which the Stone Ages were based. With few exceptions, most early stone tools were fashioned of quartz. Outcrops of quartz that were suitable for tool manufacturing were targeted by some of the earliest known mining activities and the mined quartz was traded across vast distances, even before humans began to establish agricultural societies. Even in our modern world, quartz is one of the most widely used minerals, though few people are aware of its many contributions. It is a significant component of hydrothermal veins and felsic igneous rocks, and is often the dominant mineral in sandstones and siltstones, as well as their metamorphosed equivalents. Because of their abundance, the quartz varieties are often subdivided into informal groups. Although most quartz crystals are clear and colorless, slight chemical impurities create a number of color varieties, some of which are common enough to have their own names. Translucent pink to reddish quartz is known as rose quartz, while translucent gray and cloudy white crystals are respectively called smoky quartz and milky quartz. In a similar manner, quartz that is composed of microscopic crystals chert can occur in a wide variety of colors. The most common chert color varieties are flint dark gray to black , jasper red to red-brown , and onyx mixed white and black. Agate is another variety of chert that exhibits distinct bands of color that formed as the chemistry of the fluids moving through its host rock changed slightly. It also occurs in hydrothermal veins and pegmatites. Because quartz is relatively stable at surface temperatures and pressures, it can be concentrated by weathering processes to be even more abundant in sedimentary rocks than it is in igneous rocks. Quartz sand grains are a significant component of most sandstones and siltstones, and some detrital sedimentary rocks are almost exclusively composed of quartz grains. Metamorphism of these sedimentary rocks produces quartzite, a metamorphic rock composed almost entirely of quartz. These gizzard stones, called gastroliths, are almost always composed solely of quartz. Other stones the dinosaur may have swallowed broke down in the swirl of its strong stomach acids, only leaving quartz rocks to survive as working gastroliths. Although it is chemically resistant, quartz is weakly soluble so most natural waters contain some dissolved silica that can precipitate as quartz. Hence quartz is a common vein-filling and cavity-filling mineral in rocks through which silica-rich waters have moved. Some microscopic marine plankton, like diatoms and radiolarians, take advantage of the dissolved silica in seawater to create shells of quartz. These can accumulate on the sea floor, particularly in deep sea areas. Under very high pressure, water can dissolve calcite and aragonite shells rather easily, while less soluble quartz shells are left to form quartz-rich deposits. Microscopic quartz crystals often form chert seams and nodules as silica-rich groundwater moves through a variety of sedimentary and metamorphic rocks. Since quartz occurs in so many different geological settings, it can be associated with many different minerals. In igneous rocks and pegmatites, quartz usually occurs with potassium feldspars, muscovite, biotite and amphiboles. In sedimentary rocks or metamorphosed sedimentary rocks, quartz may be associated with potassium feldspar, calcite, dolomite or a variety of clay minerals. The Economic Importance of Quartz So many varieties of quartz have played such crucial roles in human society that untangling the web of names and terms is daunting. In our earliest human experience, the microcrystalline varieties of quartz played an unparalleled role in setting our ancestors on the path towards modern civilization. The many varieties of chert were some of the first materials beyond wood and bone to be sculpted into tools. When a piece of chert is struck, it can break with conchoidal fracture to create a sharp edge. Early humans learned to work chert, breaking it systematically to create tools. Later, humans learned to work obsidian volcanic glass as well, but even through the Neolithic Age, most stone tools were made from chert. Its use in our modern world is nearly as prevalent. Although glass is one of its most familiar products, our society has a remarkable range of uses for quartz. Large amounts are used as flux in metallurgy and as an abrasive and filler in refractories. Crucibles designed for use at high temperatures are made of fused silica, and pure quartz sands are also used in the manufacture of glass and glass ceramics. Quartz-rich rocks like quartzite and quartz sandstone are often used as building stones and some colored quartz varieties are used as ornamental and semi-precious stones. By volume though, the bulk of all commercially mined quartz is used in the construction industry as aggregate for concrete and as sand in mortar and cement. As a result, from buildings to roads a remarkable amount of our modern infrastructure is built of quartz. Because of its physical strength, ground quartz is used as an abrasive in stonecutting, sandblasting, and scouring soaps. Since it is chemically stable, crushed quartzite fragments are often used as ballast finely broken rock fragments along railroad lines and highway shoulders. Pure, fine quartz sands are also used in water purification systems as a filter since it will not react with the water and the pores between the sand grains are small enough to filter out many impurities. Many species of marine plankton, called diatoms, construct their shells of quartz. As these microscopic organisms die, they sink down to cover the deep sea floor with layers of porous diatom shells. Diatomaceous earth has some unusual uses. It is used to filter some of the best wines and as the abrasive part of toothpaste. Since it is composed of quartz, the shells are harder than the apatite and calcite minerals that make up our teeth. When you polish your teeth, you actually are grinding the surface down with a very fine abrasive, often the shells of long dead plankton. One of the more interesting properties of some pure quartz crystals is that they are piezoelectric â€” that means that when it is put under pressure, the crystal produces an electric voltage. This characteristic allows quartz crystals to be used to measure pressures or control the frequency of electric impulses, which led to their use in radio systems and timepieces. From a historic perspective, however, the single most important use of quartz may have been to start fires. When chert is struck against iron, it produces a relatively long-lived spark. From prehistoric times on, this has been one of the most reliable and widespread means of starting a fire until the advent of matches, and was the basic firing mechanism of colonial age flintlock muskets. Since quartz is hard and comes in many color varieties, the chert forms of quartz are often used a gemstones. Both types of onyx are used as decorative stone, but differ in their uses. Since it is harder, quartz onyx is more frequently used for jewelry and other objects that must withstand greater handling and wear. Opal is a well-known gemstone often mistaken as a variety of finely crystalline quartz chert. Technically opal is not a true mineral though, but something called a mineraloid. Mineraloids are amorphous solids, which means that they do not have a set crystal structure. To be a true mineral, a solid must have a crystalline structure. Opal is found as a vein-filling or void-filling material in rocks through which silica-rich waters have moved. Although opal is technically neither a variety of quartz nor even a true mineral, in the jewelry trade it is often considered as both. The Environmental Implications of Quartz Use Although quartz is chemically stable and is non-toxic, like any fine particle quartz dust can be hazardous if it is inhaled. Construction workers using sandblasting equipment or even home repair enthusiasts working with cement dust should use good quality masks to avoid breathing airborne quartz dust.

ROCKS AND STRUCTURE OF THE QUARTZ SPRING AREA pdf

2: University of Minnesotaâ€™s Mineral Pages: Quartz

Get this from a library! Rocks and structure of the Quartz Spring area: northern Panamint Range, California.. [James Franklin McAllister].

New Mexico Geology, v. It was established in as the first park in the United States that allowed collecting of rocks and minerals for personal use. Each visitor is allowed to collect as much as 15 lb of rocks and minerals from the 1,acre park; mineral dealers are not allowed to collect for sale. Spring Canyon lies in the northern Florida Mountains, south of the main park, and is open for day use only from Easter through November. The main park provides excellent views of the surrounding mountain desert. Basin and Range topography is easily seen in the distance. On a clear day the smokestacks of the Hurley smelter can be seen to the northwest. The Cobre Mountains form the far northern horizon behind the smokestacks. The Burro Mountains lie to the west-northwest; the Victorio Mountains lie to the west-southwest. The Florida Mountains lie directly to the south of the main state park; Florida Gap separates the two ranges. The Cedar Mountains lie to the south-southwest. The dark mountain north of Deming is called Black Mountain. Spring Canyon in the Florida Mountains is a sheltered canyon and offers solitude common to many canyons throughout the desert Southwest. Elevations range from 4, ft along the foothills, where the state park is located, to 7, ft at Florida Peak in the Florida Mountains. Water is scarce and limited to wells and hidden springs, but be careful of thunderstorms and flash floods during the summer months! Despite the dry, seemingly inhospitable environment, life abounds. The area is home to many lizards and snakes, deer, antelope, coyotes, and small mammals such as prairie dogs, rabbits, badgers, and many birds. Mountain lion and desert bighorn sheep may be seen at the higher elevations of the Florida Mountains. A variety of plants thrive in this environment, including yucca, prickly pear cactus, barrel cactus, ocotillo, creosote bush, mesquite, and hackberry; juniper and scrub oak are common in the canyons. Paleozoic through lower Tertiary sedimentary rocks overlie a Cambrian granitic to syenitic pluton in the northern Florida Mountains Clemons and Brown, ; Clemons, , The Starvation Draw Member consists of volcanic breccias, conglomerates, and lavas of andesitic composition. The Little Florida Mountains consist predominantly of interbedded mid-Tertiary andesitic, dacitic, and rhyolitic ash-flow tuffs and lavas, and volcanic-derived fanglomerates intruded by rhyolite domes and dikes Fig. The earliest evidence of volcanic activity in the Little Florida Mountains are small outcrops of ash-flow tuffs exposed approximately 1 mile north of the state park Fig. This ash flow may correlate with the During ash-flow eruptions, volcanic ash can travel a great distance from the source vent. In some cases, the ash is still very hot when deposited and can then fuse, or weld, into a very dense, hard layer of rock, such as the ash-flow tuff found in the Little Florida Mountains. The ash-flow tuff is overlain by andesite flows andesite of Little Florida Mountains that were probably erupted from shield or stratovolcanoes. The vents of these once-prominent volcanoes are difficult to impossible to find because of local faulting and rapid erosion. The andesites subsequently were intruded by rhyolite domes and covered by rhyolite lavas and tuffs Fig 2 ; rhyolite tuff [Tlt] and rhyolite [Tlr] of Little Florida Mountains; Clemons, Volcanic activity was relatively brief in geologic time; rhyolite and andesite samples from the state park range in age from Seismic data suggest that there are only ft of volcanic rock in the subsurface in the area of the state park. Erosion of the volcanic rocks began during and after eruption. The fanglomerate of Little Florida Mountains was the first of the deposits that formed by erosion of the volcanic rocks and is Miocene in age Clemons, ; Kiely and James, Dacite flows were erupted onto the fanglomerate of Little Florida Mountains. During and after this brief period of volcanic activity, regional tectonics i. Wind, water, and ice have continued to break up the rocks through time and to carry fragments downslope forming the gently sloping bajadas or alluvial fans at the base of the mountains. The campground at Rockhound lies on one of these bajadas. Geothermal ground waters and springs were associated with the volcanic activity. Silica cementation of the younger fanglomerate of Little Florida Mountains indicates that these fluids continued to circulate long after eruption of the volcanic rocks and during their erosion Kiely and James, Manganese-oxide and fluorite veins that cut the fanglomerate of Little Florida Mountains in the northeastern part of the Little Florida Mountains were also formed during this time. These deposits are present where various manganese- and iron-oxide minerals, along with fluorite, barite, calcite, and quartz, are found in the fanglomerate of Little Florida Mountains Lasky, ; Clemons, ; Kiely and James, Hydrothermal fluids that contained high concentrations of manganese and fluorite, along with silica, also formed these mineral deposits. The Manganese mine was one of the larger producing mines in the district. The mines are extremely unsafe, and visitors should not enter the adits. Care is needed around the shafts and prospect pits as well. Fluorite production from epithermal fluorite veins is estimated as 13, short tons, mostly from the Spar mine McAnulty, Manganese production from epithermal manganese veins is reported as 19, long tons of ore and 21, long tons of concentrate Farnham, ; McLemore et al. Production of manganese ceased in when the Federal government ended its buying program. Mineral deposits were discovered in in the Florida Mountains district south of Spring Canyon in the main Florida Mountains. Hydrothermal fluids that created replacement deposits in carbonate rocks also formed these deposits. The hot fluids actually dissolved the limestone and dolomite in the carbonate rocks and left cavities that were later filled by precipitation of minerals from the fluids. The Mahoney and Silver Cave mines were the largest metal producers. The basins around the Little Florida and Florida Mountains subsided as the mountains were uplifted. Rain and snow melt from the local mountains, including the Little Florida and Florida Mountains as well as the Cobre Mountains and Black Range north of Deming, percolated through the rocks, migrated into the basins, and formed large reservoirs of ground water that we call aquifers. Today, this ground water is being pumped from the basins surrounding Deming faster than it can be replaced by current rainfall. Formation of thundereggs and geodes Gray perlite, thundereggs, geodes, jasper, onyx, agate, crystalline rhyolite, Apache tears obsidian , and quartz crystals are among the more common rocks and minerals found in the park. Thompsonite, a zeolite, is found in amygdules in quartz latite Northrop and LaBruzza, Agate is present in a wide range of colors and is one of the minerals that many visitors collect at Rockhound State Park. Some thundereggs and geodes found at Rockhound contain multicolored agate in addition to well-formed quartz crystals. The difference between geodes, thundereggs, and concretions can be confusing. Spherulites are made of radial crystals extending from the center. Prehistoric Indians found solid nodules near Mt. Hood in Oregon and thought that when the gods or spirits who inhabited the mountains became angry with one another they would hurl nodules at each other with accompanying thunder and lightning. Hence they called these nodules thundereggs Shaub, Many thundereggs found at Rockhound State Park are spherical and consist of two distinct parts: In many examples, these two parts can be described as a shell and a filling. However, some thundereggs, or spherulites, do not contain the filling; they are composed of solid dark-gray to pinkish shell material Fig. Geologically distinct processes form the two parts of the thundereggs. The outer part of the thundereggs is formed by complex magmatic processes i. The processes that form geodes and thundereggs are complex and are controlled by constantly changing physical and chemical conditions, such as temperature, pressure, depth of formation, composition of the magma, composition of the ground water, and composition of the host rocks. In order to better understand the processes by which the thundereggs form, samples from Rockhound State Park were examined using a specialized microscope called an electron microprobe. The instrument used is a Cameca SX microprobe. It produces a beam of electrons that is focused onto a polished sample surface and then allows investigation of the distribution of chemical elements on the sample surface. The exact composition of minerals within a polished sample can also be determined by quantitatively analyzing characteristic electrons emitted from the sample. Microprobe examination of the "shell" portion of Rockhound spherulites Fig. The images from the microprobe show that the spherulites are formed either of intimately intergrown quartz, feldspar, and magnetite or of bands of quartz systematically interspersed with bands of intergrown feldspar and quartz Figs. This banding produces the concentric structure that is apparent in some spherulites. Quartz veinlets crosscutting the banded structure are also observed Fig. Figure 4 â€" Backscattered electron images of polished samples of a Rockhound spherulite. Intimately intergrown quartz, feldspar, and magnetite. The darkest gray shade represents quartz, lighter gray represents feldspar, and the white represents magnetite. Banded intergrowth of dominantly feldspar brighter bands and dominantly quartz bands darker bands. White areas are magnetite. Quartz veins crosscutting the banded crystallization can be seen. The observed patterns of crystal growth in the spherulites suggest that they may have formed during the cooling of the rhyolite lava. Similar spherulitic features were observed in an artificial melt that was rapidly cooled Jacobs et al. Spherulitic growth occurred during this crystallization process, and the internal structure of the artificially produced spherulites was very similar to the internal structure of Rockhound spherulites, although in the artificial melt the phenocryst phases were plagioclase and pyroxene rather than quartz and two feldspars. Furthermore, the feathery and non-equant shapes Fig. How do the spherulites become hollow? Although this is difficult to demonstrate directly, we speculate that the hollow centers of spherulites are formed by nucleation, coalescence, and expansion of vapor bubbles at high temperature, resulting in a hollow center that can be filled later by silica. The vapor bubbles would have formed as a result of crystallization of quartz, feldspar, and magnetite, which contain no water, from rhyolitic magma, which contains a small amount of dissolved water at atmospheric pressure Taylor, Calculations of the volume of water vapor that could have formed from anhydrous crystallization suggest that the volume would be more than enough to generate the size of hollow cavities seen in spherulites. The reason that some spherulites are hollow and others are not may be related to the rate and depth of crystallization and to the resultant ability or inability of vapor bubbles to nucleate and coalesce. The agate, chalcedony, and quartz veins and open-space-fillings within voids in the spherulites formed later by multiple cycles of hydrothermal fluids. Hydrothermal fluids are a mixture of late-stage fluids escaping the magma and local ground water. The fluids contain some elements from the original magma and also dissolved minerals from the country rock. The amount of ions that the fluid can dissolve depends upon pH, temperature, pressure, and composition of the fluid. The hydrothermal fluids move through fractures in the rocks, which crosscut the igneous textures, and form veins or banded agate, chalcedony, and quartz. Some of these fluids seep through microscopic pores and into spherulites and gas pockets in the volcanic rocks, and they precipitate crystals along the walls of the cavity, forming geodes and geode-like spherulites.

3: Rocks and Gems - Prospecting Texas

Full text of "Rocks and structure of the Quartz Spring area: northern Panamint Range, California" See other formats.

Some clear quartz crystals can be treated using heat or gamma-irradiation to induce color where it would not otherwise have occurred naturally. Susceptibility to such treatments depends on the location from which the quartz was mined. Although citrine occurs naturally, the majority is the result of heat-treated amethyst. Carnelian is widely heat-treated to deepen its color. Because natural quartz is often twinned , synthetic quartz is produced for use in industry. Large, flawless, single crystals are synthesized in an autoclave via the hydrothermal process ; emeralds are also synthesized in this fashion. Like other crystals, quartz may be coated with metal vapors to give it an attractive sheen. The thin cm wide brighter layers are quartz veins, formed during the late stages of crystallization of granitic magmas. They are sometimes called "hydrothermal veins". Quartz is a defining constituent of granite and other felsic igneous rocks. It is very common in sedimentary rocks such as sandstone and shale. It is a common constituent of schist , gneiss , quartzite and other metamorphic rocks. Quartz has the lowest potential for weathering in the Goldich dissolution series and consequently it is very common as a residual mineral in stream sediments and residual soils. While the majority of quartz crystallizes from molten magma , much quartz also chemically precipitates from hot hydrothermal veins as gangue , sometimes with ore minerals like gold, silver and copper. Large crystals of quartz are found in magmatic pegmatites. Well-formed crystals may reach several meters in length and weigh hundreds of kilograms. Naturally occurring quartz crystals of extremely high purity, necessary for the crucibles and other equipment used for growing silicon wafers in the semiconductor industry, are expensive and rare. Stishovite is a yet denser and higher-pressure polymorph of SiO2 found in some meteorite impact sites. Lechatelierite is an amorphous silica glass SiO2 which is formed by lightning strikes in quartz sand. Fatimid ewer in carved rock crystal clear quartz with gold lid, c. It is found regularly in passage tomb cemeteries in Europe in a burial context, such as Newgrange or Carrowmore in Ireland. Quartz was also used in Prehistoric Ireland , as well as many other countries, for stone tools ; both vein quartz and rock crystal were knapped as part of the lithic technology of the prehistoric peoples. The tradition continued to produce objects that were very highly valued until the midth century, when it largely fell from fashion except in jewelry. Cameo technique exploits the bands of color in onyx and other varieties. Rock crystal jug with cut festoon decoration by Milan workshop from the second half of the 16th century, National Museum in Warsaw. The city of Milan, apart from Prague and Florence , was the main Renaissance centre for crystal cutting. He supported this idea by saying that quartz is found near glaciers in the Alps, but not on volcanic mountains, and that large quartz crystals were fashioned into spheres to cool the hands. This idea persisted until at least the 17th century. He also knew of the ability of quartz to split light into a spectrum. The only source of suitable crystals was Brazil; however, World War II disrupted the supplies from Brazil, so nations attempted to synthesize quartz on a commercial scale. German mineralogist Richard Nacken â€" achieved some success during the s and s. In the United States, the U. By , Brush Development had grown crystals that were 1. Piezoelectricity[edit] Some types of quartz crystals have piezoelectric properties; they develop an electric potential upon the application of mechanical stress. One of the most common piezoelectric uses of quartz today is as a crystal oscillator. The quartz clock is a familiar device using the mineral. The resonant frequency of a quartz crystal oscillator is changed by mechanically loading it, and this principle is used for very accurate measurements of very small mass changes in the quartz crystal microbalance and in thin-film thickness monitors.

ROCKS AND STRUCTURE OF THE QUARTZ SPRING AREA pdf

4: Rock Info | Rock Hunting in the Big Bend of Texas

2. Rocks and structure of the Quartz spring area, northern Panamint Range, California. 2.

Sun, June 6, From the highest point of the molten lava-formed Black Mesa in the far northwest to the vast range of the Kiamichi Mountains in the southeastern region of the state, Oklahoma rocks. There are many ways to enjoy the many geological and mineral formations in the state. Starting small and working up, rock hounds can find ample varieties of stones, gems and fossils on exhibit in the Midgley Museum in Enid. Housed in the former home of Enid residents Dan and Libbie Midgley, the walls of the museum are built from petrified wood, rock and fossils found in Oklahoma and surrounding states, making the structure a rocky showpiece in itself. The barite formed in a flowery shape and colored by the red soil are found only in a few places around the world, including central Oklahoma. As a child, taking a spoon to the back yard and digging up stones to collect for keepsakes was always fun. At Salt Plains National Wildlife Refuge near Cherokee, visitors can spend hours re-creating those childhood memories by digging in the sand and salt for the elusive selenite crystal. The crystals, also known as "stone of the moon," are unusually shaped crystals of gypsum found only in the northern part of the state. Digging for them is a dirty but fun job, and shovels or hand spades, not spoons, are highly recommended when searching for the crystal treasures. After a hard day on the salt plains, crystal buffs can relax in the comfort of a cabin or campsite in nearby Great Salt Plains State Park. The towering walls of the canyons are a preferred destination for hikers, rock climbers and rappellers. The rugged sandstone canyons and cliffs were formed more than million years ago by wind, water and natural erosion. Specific walls within the canyon are designated for climbing and rappelling, however guests must bring their own safety-certified equipment. After a long day of scaling the heights, guests can cool off in the swimming pool in the park. Sites for recreational vehicles and tents are offered in the park, as well as a group camp with cabins to accommodate larger parties. The tall, granite, dome-shape formation rises high above the prairie. A variety of high and low angle faces offer a challenge to wall climbers who enjoy going vertical. The Wichita Mountains in southwestern Oklahoma near Lawton offer a wide array of areas for visitors. Climbers, hikers and bikers converge on the mountains to test their skills on the wide-ranging terrain. Mount Scott, the best known peak in the Wichita Mountain Wildlife Refuge, is one of the more popular areas for climbing and hiking. Visitors can explore the mountain by driving to the top and taking in the incredible view, or starting at the bottom and trekking your way up the mountain. The refuge holds an assortment of wildlife including buffalo, longhorn cattle, elk and deer. Wildflowers in bloom are a spectacular sight beginning in spring and continuing through summer. Nearby Lake Lawtonka and Lake Elmer Thomas are ideal destinations for water lovers to enjoy swimming, fishing and water sports activities, or to park a recreational vehicle or pitch a tent and relax around a campfire. In central Oklahoma from Sulphur to near Ardmore, the Arbuckle Mountains are overflowing with activities for outdoor lovers. The range of smaller mountains spills over into a large area, allowing hikers the chance to explore the ancient terrain. The Chickasaw National Recreation Area in Sulphur is a haven for families who enjoy camping, hiking, nature trails and fishing. The Travertine Nature Center in the park is an educational center where guests can learn more about the ecosystem and history of the region. The cool, clear water of nearby Lake of the Arbuckles is a great getaway for fishing, water enthusiasts and campers. A popular recreation area in the Arbuckle range is Turner Falls Park, just outside Davis, where the main attraction is the foot waterfall and natural swimming pool. Tent and recreational vehicle sites as well as cabins are available for guests who want to stay and check out the various rock formations, natural caves, hiking and equestrian trails included in the park area. One of the most picturesque areas in the state is the Kiamichi Mountain range in southeastern Oklahoma. The tall pines that sprout from the hills of the Ouachita National Forest reach skyward, sometimes seeming to touch the low, feathery clouds that float over the mountains. During spring and summer, the lush greenery of the landscape is inviting. But the spectacular hues of the leaves in fall attract visitors from all over. Campers can find amenities including cabins and campgrounds at Lake Wister State Park, at the northern end of the mountain range. At the southern end of the Kiamichis, guests can enjoy hiking, camping, fishing and an assortment of other outdoor activities at Beavers

Bend Resort Park near Broken Bow. There are plenty of ways to see the sights throughout the area, on foot or on horseback, in this hiking and equestrian paradise. Miles of trails accommodate two-footed and four-legged enthusiasts visiting the area year-round.

ROCKS AND STRUCTURE OF THE QUARTZ SPRING AREA pdf

5: Full text of "Rocks and structure of the Quartz Spring area : northern Panamint Range, California"

The area lies within a âˆ¼15 km-wide compartment of polyphase-deformed Dalradian (Neoproterozoic) rocks, bounded by the NE-trending Tyndrum and Ericht-Laidon transcurrent faults. Sinistral movement on these faults caused a periclinal structure, the Orchy Dome, to develop from flat-lying Dalradian rocks.

The second generation tip typically becomes larger than the first generation tip, but might also become smaller. A scepter can be shifted sideways and does not need to be centered on the first generation tip. However, there is a problem with a definition that is based on the idea of a second generation: Another difficult case are reverse scepters in which the scepter is smaller than the underlying tip. Here the smaller tip very often does not show any properties that clearly distinguish it from the rest of the crystal and that would justify calling it a second generation. Instead, the crystals often appear to have grown continuously into the reverse scepter or multiple scepter shape. In all cases, the scepter develops from the already present crystal lattice of the crystal underneath. Such a crystallographically well defined intergrowth of different minerals is called an epitaxy. In a sense, a scepter represents an epitaxy of quartz on quartz, and because it is the same mineral, it is sometimes called an autotaxy. Scepters are quite common in certain geological environments. Amethyst from alpine-type fissures in igneous and highly metamorphosed rocks usually occurs as scepters on top of colorless or smoky crystals not only in the Alps, but for example also in southern Norway or northern Greece. Here, the amethyst generation grew at lower temperatures than the first generation quartz. The same growth form can be observed in pegmatites and miaroles in igneous rocks for example, amethyst scepters from the Brandberg, Namibia, or from pegmatites in Minas Gerais, Brazil. Scepters are commonly of normal habit and are never tapered. Scepters tend to assume a short prismatic habit. Many scepters show only a weak striation on their prism faces, sometimes it is even missing. Scepters do not show split growth patterns. Scepters rarely show trigonal habits with very small or missing z-faces. An exception are reverse scepters and the normal scepters associated with them. Scepters are often associated with skeleton growth forms skeleton or window quartz. Often they are more colorful and transparent. Amethyst scepters are very common, smoky quartz scepters -often with uneven color distribution- are common. Summarizing the exceptions above: Reverse scepters and the normal scepters associated with them seem to have a different set of properties. Formation One theory is that a scepter forms when crystal growth is interrupted and parts of the crystal are covered with some material that inhibits further growth. The growth inhibiting material might be only present as a very thin layer and invisible. The very tip of the crystal or the entire rhombohedral faces remain free of that material, and should the conditions change again, the crystal continues to grow from the tip. If you see multiple scepters, then often alongside simple scepters, although multiple changes in the environment should have affected the morphology of all of them equally. Another problem is that you would not expect to see a fully-grown scepter that encloses the former tip like an onion if the crystal simply started growing from a single point on the surface of the tip. Such a crystal would finally grow into an elongated crystal and would at best assume the shape of a reverse scepter. Even if you just take Alpine locations, it is hard to imagine that the environmental conditions in all those locations have undergone a single sudden change that led to a temporary growth inhibition on the crystals, followed by a very distinctive growth pattern, the formation of scepters. The internal structure of scepters from Alpine-type fissures and of scepters in general is perhaps always lamellar , as opposed to the macromosaic structure of many quartz crystals from Alpine-type fissures. Quartz crystals with a macromosaic structure may carry a scepter, but the scepter will then show lamellar structure.

ROCKS AND STRUCTURE OF THE QUARTZ SPRING AREA pdf

6: Geology of the Death Valley area - Wikipedia

a texture of metamorphic rocks in which particularly large grains are surrounded by a fine-grained matrix of other minerals hydrothermal veins fractures are filled by minerals from an area where ocean water sinks through cracks in the ocean floor, is heated by the underlying magma, and rises again through the cracks.

Uses Glass making, abrasive, foundry sand, hydraulic fracturing proppant, gemstones Flint: Flint is a variety of microcrystalline or cryptocrystalline quartz. It occurs as nodules and concretionary masses and less frequently as a layered deposit. It breaks consistently with a conchoidal fracture and was one of the first materials used to make tools by early people. They used it to make cutting tools. After thousands of years, people continue to use it. It is presently used as the cutting edge in some of the finest surgical tools. This specimen is about four inches ten centimeters across and is from Dover Cliffs, England. One of the first uses of quartz, in the form of flint , was the production of sharp objects such as knife blades, scrapers, and projectile points such as the arrowheads shown above. What are the Uses for Quartz? Quartz is one of the most useful natural materials. Its usefulness can be linked to its physical and chemical properties. It has a hardness of seven on the Mohs Scale which makes it very durable. It is chemically inert in contact with most substances. It has electrical properties and heat resistance that make it valuable in electronic products. Its luster, color, and diaphaneity make it useful as a gemstone and also in the making of glass. These deposits have been identified and produced as sources of high purity silica sand. These sands are used in the glassmaking industry. Quartz sand is used in the production of container glass, flat plate glass, specialty glass, and fiberglass. Glassmaking is one of the primary uses of quartz. Quartz is often used in jewelry or as a gemstone. These jasper beads are an example of quartz used as a gemstone. High-purity quartz sandstone suitable for the manufacture of high-quality glass. Much of it has been used for container glass, but some of it has been selected for use in making lenses for the largest telescopes. Specimen is about four inches ten centimeters across. Aventurine is colorful variety of quartz that contains abundant shiny inclusions of minerals such as mica or hematite. It is often cut and polished for use as an ornamental stone. Common colors for aventurine are green, orange, and blue. This specimen is about four inches ten centimeters across and is from India. Uses of Quartz as an Abrasive The high hardness of quartz, seven on the Mohs Scale, makes it harder than most other natural substances. As such it is an excellent abrasive material. Quartz sands and finely ground silica sand are used for sand blasting, scouring cleansers, grinding media, and grit for sanding and sawing. Uses of Quartz as a Foundry Sand Quartz is very resistant to both chemicals and heat. It is therefore often used as a foundry sand. With a melting temperature higher than most metals, it can be used for the molds and cores of common foundry work. Refractory bricks are often made of quartz sand because of its high heat resistance. Quartz sand is also used as a flux in the smelting of metals. Silicified "petrified" wood is formed when buried plant debris is infiltrated with mineral-bearing waters which precipitate quartz. This quartz infills the cavities within the wood and often replaces the woody tissues. This specimen is about four inches ten centimeters across and is from Yuma County, Arizona. Uses in the Petroleum Industry Quartz sand has a high resistance to being crushed. In the petroleum industry, sand slurries are forced down oil and gas wells under very high pressures in a process known as hydraulic fracturing. This high pressure fractures the reservoir rocks, and the sandy slurry injects into the fractures. The durable sand grains hold the fractures open after the pressure is released. These open fractures facilitate the flow of natural gas into the well bore. The best way to learn about minerals is to study with a collection of small specimens that you can handle, examine, and observe their properties. Inexpensive mineral collections are available in the Geology. Chert is a microcrystalline or cryptocrystalline quartz. This specimen is about four inches ten centimeters across and is from Joplin, Missouri. Many Other Quartz Sand Uses Quartz sand is used as a filler in the manufacture of rubber, paint, and putty. Screened and washed, carefully sized quartz grains are used as filter media and roofing granules. Quartz sands are used for traction in the railroad and mining industries. A Herkimer "Diamond" quartz crystal in dolostone. This specimen is about six inches fifteen centimeters across and is from Middleville, New York. Uses for Quartz Crystals One of the most amazing properties of quartz is the ability of its crystals to vibrate at a precise frequencies. These frequencies are so precise that quartz crystals can be used to make extremely accurate time-keeping instruments and equipment that can transmit radio and television signals with precise and stable frequencies. Today, billions of quartz crystals are used to make oscillators for watches, clocks, radios, televisions, electronic games, computers, cell phones, electronic meters, and GPS equipment. A wide variety of uses have also been developed for optical-grade quartz crystals. They are used to make specialized lenses, windows and filters used in lasers, microscopes, telescopes, electronic sensors, and scientific instruments. A Need for Synthetic Quartz Crystals During the s the demand for high-quality quartz crystals accelerated so rapidly that mining operations around the world were unable to supply them in adequate quantities. Fortunately, this need was realized during World War II, and military and private industry began working on methods to grow synthetic quartz crystals to meet the special requirements of optical and electronics use. Today, most of the quartz crystals used in electronic components and optical instruments are grown in laboratories instead of produced from mines. Most of the laboratories grow their crystals using methods based upon the geological process of hydrothermal activity. The synthetic crystals are grown at high temperatures from superheated waters that are rich in dissolved silica. These manufactured crystals can be grown in shapes, sizes and colors that match the needs of manufacturing processes. The cost of growing synthetic quartz crystals is competitive with mining, and the only limit on production is the availability of crystal growth equipment. A bicolor stone combining golden citrine and purple amethyst. This gem measures about 8x10 mm. Quartz as a Gemstone Quartz makes an excellent gemstone. It is hard, durable, and usually accepts a brilliant polish. Popular varieties of quartz that are widely used as gems include: Agate and jasper are also varieties of quartz with a microcrystalline structure. Translucent rose quartz in the rough. Translucent rose quartz - cut and polished beads. Each bead is about ten millimeters in diameter. Novaculite is a dense, cryptocrystalline variety of quartz with a fine-grained and very uniform texture. As quartz, it has a hardness of 7 harder than steel and is used as a "whetstone" for sharpening knives. Special Silica Stone Uses "Silica stone" is an industrial term for materials such as quartzite, novaculite , and other microcrystalline quartz rocks. These are used to produce abrasive tools, deburring media, grinding stones, hones, oilstones, stone files, tube-mill liners, and whetstones. Tripoli Tripoli is crystalline silica of an extremely fine grain size less than ten micrometers. Commercial tripoli is a nearly pure silica material that is used for a variety of mild abrasive purposes which include: It can be used as a polish when making tumbled stones in a rock tumbler. Tripoli is also used in brake friction products, fillers in enamel, caulking compounds, plastic, paint, rubber, and refractories.

7: Wisconsin Geological & Natural History Survey Â» Quartz

Quartz is one of the most well-known minerals on earth. It occurs in basically all mineral environments, and is the important constituent of many rocks. Quartz is also the most varied of all minerals, occurring in all different forms, habits, and colors.

Common examples include limestone and dolostone. Evaporite sedimentary rocks are composed of minerals formed from the evaporation of water. Evaporite rocks commonly include abundant halite rock salt , gypsum , and anhydrite. Common examples include coal , oil shale as well as source rocks for oil and natural gas. Siliceous sedimentary rocks are almost entirely composed of silica SiO 2 , typically as chert , opal , chalcedony or other microcrystalline forms. This sediment is often formed when weathering and erosion break down a rock into loose material in a source area. The material is then transported from the source area to the deposition area. The type of sediment transported depends on the geology of the hinterland the source area of the sediment. However, some sedimentary rocks, such as evaporites , are composed of material that form at the place of deposition. The nature of a sedimentary rock, therefore, not only depends on the sediment supply, but also on the sedimentary depositional environment in which it formed. Transformation Diagenesis Pressure solution at work in a clastic rock. While material dissolves at places where grains are in contact, that material may recrystallize from the solution and act as cement in open pore spaces. As a result, there is a net flow of material from areas under high stress to those under low stress, producing a sedimentary rock that is more compact and harder. Loose sand can become sandstone in this way. Some of those processes cause the sediment to consolidate into a compact, solid substance from the originally loose material. Young sedimentary rocks, especially those of Quaternary age the most recent period of the geologic time scale are often still unconsolidated. As sediment deposition builds up, the overburden lithostatic pressure rises, and a process known as lithification takes place. Sedimentary rocks are often saturated with seawater or groundwater , in which minerals can dissolve, or from which minerals can precipitate. Precipitating minerals reduce the pore space in a rock, a process called cementation. Due to the decrease in pore space, the original connate fluids are expelled. The precipitated minerals form a cement and make the rock more compact and competent. In this way, loose clasts in a sedimentary rock can become "glued" together. When sedimentation continues, an older rock layer becomes buried deeper as a result. The lithostatic pressure in the rock increases due to the weight of the overlying sediment. This causes compaction, a process in which grains mechanically reorganize. During compaction, this interstitial water is pressed out of pore spaces. Compaction can also be the result of dissolution of grains by pressure solution. The dissolved material precipitates again in open pore spaces, which means there is a net flow of material into the pores. However, in some cases, a certain mineral dissolves and does not precipitate again. This process, called leaching , increases pore space in the rock. Some biochemical processes, like the activity of bacteria , can affect minerals in a rock and are therefore seen as part of diagenesis. Fungi and plants by their roots and various other organisms that live beneath the surface can also influence diagenesis. Burial of rocks due to ongoing sedimentation leads to increased pressure and temperature, which stimulates certain chemical reactions. An example is the reactions by which organic material becomes lignite or coal. When temperature and pressure increase still further, the realm of diagenesis makes way for metamorphism , the process that forms metamorphic rock. Properties A piece of a banded iron formation , a type of rock that consists of alternating layers with iron III oxide red and iron II oxide grey. BIFs were mostly formed during the Precambrian , when the atmosphere was not yet rich in oxygen. Moories Group , Barberton Greenstone Belt , South Africa Color The color of a sedimentary rock is often mostly determined by iron , an element with two major oxides: Iron II oxide FeO only forms under low oxygen anoxic circumstances and gives the rock a grey or greenish colour. Iron III oxide Fe2O3 in a richer oxygen environment is often found in the form of the mineral hematite and gives the rock a reddish to brownish colour. In arid continental climates rocks are in direct contact with the atmosphere, and oxidation is an important process, giving the rock a red or orange colour. Thick sequences of red sedimentary rocks formed in arid climates are called red beds. However, a red colour does not necessarily mean the rock formed in a continental environment or arid climate. Organic material is formed from dead organisms, mostly plants. Normally, such material eventually decays by oxidation or bacterial activity. Under anoxic circumstances, however, organic material cannot decay and leaves a dark sediment, rich in organic material. This can, for example, occur at the bottom of deep seas and lakes. There is little water mixing in such environments; as a result, oxygen from surface water is not brought down, and the deposited sediment is normally a fine dark clay. Dark rocks, rich in organic material, are therefore often shales. The texture is a small-scale property of a rock, but determines many of its large-scale properties, such as the density , porosity or permeability. Between the clasts, the rock can be composed of a matrix a cement that consists of crystals of one or more precipitated minerals. The size and form of clasts can be used to determine the velocity and direction of current in the sedimentary environment that moved the clasts from their origin; fine, calcareous mud only settles in quiet water while gravel and larger clasts are moved only by rapidly moving water. The statistical distribution of grain sizes is different for different rock types and is described in a property called the sorting of the rock. Coquina , a rock composed of clasts of broken shells, can only form in energetic water. The form of a clast can be described by using four parameters: Chemical sedimentary rocks have a non-clastic texture, consisting entirely of crystals. To describe such a texture, only the average size of the crystals and the fabric are necessary. Mineralogy Most sedimentary rocks contain either quartz especially siliciclastic rocks or calcite especially carbonate rocks. In contrast to igneous and metamorphic rocks, a sedimentary rock usually contains very few different major minerals. However, the origin of the minerals in a sedimentary rock is often more complex than in an igneous rock. Minerals in a sedimentary rock can have formed by precipitation during sedimentation or by diagenesis. In the second case, the mineral precipitate can have grown over an older generation of cement. Carbonate rocks dominantly consist of carbonate minerals such as calcite , aragonite or dolomite. Both the cement and the clasts including fossils and ooids of a carbonate sedimentary rock can consist of carbonate minerals. The mineralogy of a clastic rock is determined by the material supplied by the source area, the manner of its transport to the place of deposition and the stability of that particular mineral. In this series, quartz is the most stable, followed by feldspar , micas , and finally other less stable minerals that are only present when little weathering has occurred. In most sedimentary rocks, mica, feldspar and less stable minerals have been reduced to clay minerals like kaolinite , illite or smectite. Unlike most igneous and metamorphic rocks, sedimentary rocks form at temperatures and pressures that do not destroy fossil remnants. Often these fossils may only be visible under magnification. Dead organisms in nature are usually quickly removed by scavengers , bacteria , rotting and erosion, but sedimentation can contribute to exceptional circumstances where these natural processes are unable to work, causing fossilisation. The chance of fossilisation is higher when the sedimentation rate is high so that a carcass is quickly buried , in anoxic environments where little bacterial activity occurs or when the organism had a particularly hard skeleton. Larger, well-preserved fossils are relatively rare. Burrows in a turbidite , made by crustaceans , San Vincente Formation early Eocene of the Ainsa Basin , southern foreland of the Pyrenees Fossils can be both the direct remains or imprints of organisms and their skeletons. Most commonly preserved are the harder parts of organisms such as bones, shells, and the woody tissue of plants. Soft tissue has a much smaller chance of being fossilized, and the preservation of soft tissue of animals older than 40 million years is very rare. As a part of a sedimentary or metamorphic rock, fossils undergo the same diagenetic processes as does the containing rock. A shell consisting of calcite can, for example, dissolve while a cement of silica then fills the cavity. In the same way, precipitating minerals can fill cavities formerly occupied by blood vessels , vascular tissue or other soft tissues. This preserves the form of the organism but changes the chemical composition, a process called permineralization. In the case of silica cements, the process is called lithification. At high pressure and temperature, the organic material of a dead organism undergoes chemical reactions in which volatiles such as water and carbon dioxide are expulsed. The fossil, in the end, consists of a thin layer of pure carbon or its mineralized form, graphite. This form of fossilisation is called carbonisation. It is particularly important for plant fossils. Unlike textures, structures are always large-scale features that can easily be studied in the field. Sedimentary structures can indicate something about the sedimentary environment or can serve to tell which side originally faced up where tectonics have tilted or overturned sedimentary layers. Sedimentary rocks are laid down in layers called beds or strata. A bed is defined as a layer of rock that has a uniform lithology and texture. Beds form by the deposition of layers of sediment on top of each other. The sequence of beds that characterizes sedimentary rocks is called bedding. Finer, less pronounced layers are called laminae, and the structure a lamina forms in a rock is called lamination. Laminae are usually less than a few centimetres thick. In some environments, beds are deposited at a usually small angle. Sometimes multiple sets of layers with different orientations exist in the same rock, a structure called cross-bedding. Newer beds then form at an angle to older ones. The opposite of cross-bedding is parallel lamination, where all sedimentary layering is parallel. Laminae that represent seasonal changes similar to tree rings are called varves. Any sedimentary rock composed of millimeter or finer scale layers can be named with the general term laminite. When sedimentary rocks have no lamination at all, their structural character is called massive bedding.

8: Maryland Rocks: Amateur mineral hunters find treasure

Quartz crystals with a macromosaic structure may carry a scepter, but the scepter will then show lamellar structure. Posted in Crystals, Minerals, Rocks, Image format and tagged crystals, minerals, quartz, rocks on June 24, by Show-Me Rockhounds Kansas City.

Luster is a property of a mineral that tells how the mineral reflects light. Luster gives you an indication of how "Shiny" a mineral is. The luster of a mineral may differ from sample to sample. Metallic minerals shine like metal, while non-metallic minerals vary greatly in their appearance. There are many different descriptions of non-metallic luster, we are going to discuss four. They are pearly, earthy, vitreous glassy , and greasy. Pearly luster is iridescent, glows like a pearl. Greasy luster looks like the mineral is covered with grease, the mineral definitely shines. Minerals with an earthy luster have a dull look with no shine. Minerals with an earthy luster look as though they are covered with dirt or dust. The photos above shows examples of these four lusters. Minerals with a vitreous luster glassy look like small pieces of a broken glass bottle Color is the easiest of the properties to see, but it is not always the best way to identify a mineral. Many minerals have more than one color because of impurities that were present during the formation of the mineral. Quartz is an example of a mineral with many different colors. Quartz can be clear, white, blue, brown, and almost black. Amethyst is a quartz crystal with a purple color. The impurity that makes amethyst purple is manganese. A better determinant of the true color of a mineral is its streak. Streak is a test used by a geologist to see the color of the mineral under the top layer or coating on the mineral. The mineral is rubbed on a "streak plate", which is a piece of porcelain. When the mineral is rubbed across the streak plate some of the mineral is broken off and ground into a powder. This allows the geologist to see under the outer layer which could have a different color due to the mineral being exposed to the atmosphere. When minerals are exposed to the atmosphere, gasses like oxygen can chemically combine with the mineral to change its outer color. In a German scientist by the name of Frederick Mohs set up a scale to determine the approximate hardness of minerals. He arranged the minerals in his scale from softest Talc to hardest Diamond. The minerals get increasingly harder as you read down the scale, but they do not increase in hardness at a constant rate. Calcite is not twice as hard as talc and a diamond is not 10 times harder than talc. In fact a diamond is over 40 times harder than talc. The line graph above shows you this relationship. This property like color is arbitrary because the hardness of a mineral varies slightly from one specimen to the next. We can determine the approximate hardness of a mineral by running a group of tests. Scratch the mineral in question with a fingernail, penny, iron nail, or glass slide. If the mineral shows a scratch mark from one of the testing materials the mineral is said to be less hard than the mineral that scratched it. A piece of pink feldspar will not be scratched by a fingernail, penny, or an iron nail, but will be scratched by a glass slide. The feldspar is said to be harder than the first three testing materials but not as hard as the glass slide. You can use the following materials to run your own mineral hardness tests. Some minerals have a tendency to split or crack along parallel or flat planes. This property is easily seen in some minerals and you can test the mineral by breaking it with a hammer or splitting off sheets with a pen knife. These planes along which the mineral breaks are called cleavage planes. If the mineral splits easily along these planes the mineral is then said to have perfect cleavage. Mica is a good example of perfect cleavage. Feldspar is an example of a mineral with cleavage in more than one direction. Quartz is a mineral that has no cleavage at all. Quartz shatters likes glass when struck with a hammer. The biotite mica on the far left splits into sheets that are perfectly parallel. They form because of weak and strong bonds between the mica layers. The feldspar breaks into two planes at consistent angles. Fracture is related to cleavage. Fracture occurs when a mineral breaks at random lines instead of at consistent cleavage planes. Many minerals that have no cleavage or poor cleavage fracture easily. The on the far right is a good example of a rock that has conchodial glass like fracture. Quartz is a mineral that also has conchodial fracture. Only two minerals on earth are magnetic. They both have high quantities of iron. Magnetite is one of the magnetic minerals and pyrrhotite is the other. Magnetite was used by ancient sailors for compasses. They would chip off needles of magnetite and float them on water and watch the needle point to the north. The photo above shows small pieces of metal fillings magnetically attached to magnetite! The rock is a natural magnet! Calcite is pure calcium carbonate $CaCO_3$. It is found in limestone and marble. It is the cementing agent that binds sediments together into sedimentary rocks. Marble is metamorphosed changed by heat and pressure limestone. The crystals formed from pure calcite are in the form of a perfect rhomboid. A rhomboid is a six-sided solid object in which the opposite sides are parallel. It has perfect cleavage in three directions. If you hit calcite with a hammer it will break into smaller but perfectly shaped rhomboids. Calcite is number two on Mohs hardness scale. Calcite is the material that forms stalactites and stalagmites in caves. Calcite is used as a fertilizer, cement, chalk, building stone, and for the manufacture of optical instruments. Talc is a mineral that has perfect cleavage and a greasy or soapy feel. It is given the distinction of being number 1 on Mohs hardness scale. Talc is also called soapstone which is used by artists for sculptures. Talc can be ground up into talcum powder. Ground talc is also used to make crayons, paint, paper, and soap. Talc is quarried in many Northeastern states of the United States. Hematite is the most important source of iron ore in the world. The production of iron has been important to nations of the world for over years. Today the addition of other minerals to iron has lead to the production of steel which is vital to the economy of the major countries on Earth. Hematite has a red or black color but the streak is always red. The iron in the hematite turns red when it comes in contact with water and oxygen. In other words this rock is rusted!! Hematite has a metallic or earthy luster. The hardness of hematite is about 5 on Mohs hardness scale. It has no cleavage and breaks with an uneven fracture. The reddish landscape of Mars is due to the oxidized iron on its surface. This tells us that water and oxygen must have been present on Mars at one time. Small deposits are found in many states of the union. Canada and Russia are leading countries in the mining of iron ore. Magnetite is a mineral that has a very high iron content. Magnetite has a black or brownish-red color and a black streak. It has a hardness of about 6 on the Mohs hardness scale. It is one of two minerals in the world that is naturally magnetic. Magnetite, also known as lodestone, is found throughout the United States. Magnetite is an important source of iron ore and occurs in many igneous rocks. There is a city in Russia by the name of Magnitogorsk that received its name because of the unusually high quantities and quality of magnetite found in the mountains surrounding the city. Magnitogorsk is a leading iron manufacturing center in Russia today. Galena is an important source of lead. Galena may also contain silver.

9: Water and Quartz

"Silica stone" is an industrial term for materials such as quartzite, novaculite, and other microcrystalline quartz rocks. These are used to produce abrasive tools, deburring media, grinding stones, hones, oilstones, stone files, tube-mill liners, and whetstones.

A specimen of quartzite showing its conchoidal fracture and granular texture. The specimen shown is about two inches five centimeters across. Quartzite is a nonfoliated metamorphic rock composed almost entirely of quartz. It forms when a quartz-rich sandstone is altered by the heat, pressure, and chemical activity of metamorphism. These conditions recrystallize the sand grains and the silica cement that binds them together. The result is a network of interlocking quartz grains of incredible strength. The interlocking crystalline structure of quartzite makes it a hard, tough, durable rock. It is so tough that it breaks through the quartz grains rather than breaking along the boundaries between them. This is a characteristic that separates true quartzite from sandstone. Quartzite Under a Microscope: A specimen of the Bo Quartzite collected near South Troms, Norway, observed through a microscope in thin-section under cross-polarized light. The quartz grains in this view range in color from white to gray to black, and they form a tight interlocking network. Photograph by Jackdann88, used here under a Creative Commons license. Physical Properties of Quartzite Quartzite is usually white to gray in color. Some rock units that are stained by iron can be pink, red, or purple. Other impurities can cause quartzite to be yellow, orange, brown, green, or blue. The quartz content of quartzite gives it a hardness of about seven on the Mohs Hardness Scale. Its extreme toughness made it a favorite rock for use as an impact tool by early people. Its conchoidal fracture allowed it to be shaped into large cutting tools such as ax heads and scrapers. Its coarse texture made it less suitable for producing tools with fine edges such as knife blades and projectile points. A steep slope covered with an unstable blanket of quartzite scree. Scree is a name used for resistant pieces of broken rock that cover a talus slope. This photo was taken near Begunje na Gorenjskem, Slovenia. A Creative Commons image by Pinky sl. Where Does Quartzite Form? Most quartzite forms during mountain-building events at convergent plate boundaries. There, sandstone is metamorphosed into quartzite while deeply buried. Compressional forces at the plate boundary fold and fault the rocks and thicken the crust into a mountain range. Quartzite is an important rock type in folded mountain ranges throughout the world. Catoctin Mountain is part of the Blue Ridge Mountains. The Chimney Rock Formation in this area caps many of the ridges, drapes the flanks of the mountains as scree, and is made up mostly of quartzite. When the mountain ranges are worn down by weathering and erosion, less-resistant and less-durable rocks are destroyed, but the quartzite remains. This is why quartzite is so often the rock found at the crests of mountain ranges and covering their flanks as a litter of scree. Quartzite is also a poor soil-former. Unlike feldspars which break down to form clay minerals, the weathering debris of quartzite is quartz. It is therefore not a rock type that contributes well to soil formation. For that reason it is often found as exposed bedrock with little or no soil cover. A specimen of quartzite that contains significant amounts of green fuchsite, a chromium-rich muscovite mica. This specimen measures about 7 centimeters across and was collected from a small abandoned quarry where the flaggy rocks were produced and cut for use as decorative stones. Photograph by James St. John, used here under a Creative Commons license. How the Name "Quartzite" Is Used Geologists have used the name "quartzite" in a few different ways, each with a slightly different meaning. Today most geologists who use the word "quartzite" are referring to rocks that they believe are metamorphic and composed almost entirely of quartz. A few geologists use the word "quartzite" for sedimentary rocks that have an exceptionally high quartz content. This usage is falling out of favor but remains in older textbooks and other older publications. The name "quartz arenite" is a more appropriate and less confusing name for these rocks. It is often difficult or impossible to differentiate quartz arenite from quartzite. The transition of sandstone into quartzite is a gradual process. A single rock unit such as the Tuscarora Sandstone might fully fit the definition of quartzite in some parts of its extent and be better called "sandstone" in other areas. Between these areas, the names "quartzite" and "sandstone" are used inconsistently and often guided by habit. It is often called "quartzite" when rock units above and below it are clearly sedimentary. This contributes to the inconsistency in the ways that geologists use the word "quartzite. Pieces of green, yellow, and reddish orange " aventurine " from India. These pieces of rough average about 1 inch across and were sold for making tumbled stones in a rock tumbler. Much of the "aventurine" sold for lapidary use is actually quartzite. Often it exhibits no aventurescence. Wise geologists, who have memorable experiences with quartzites, hit them with a rock hammer only when necessary. If a freshly broken piece is needed for examination, they break off a small protrusion with a light tap. That small piece is usually more than enough. If you must, be sure that you are wearing impact-resistant goggles, gloves, long sleeves, long pants, and sturdy shoes. A sharp hammer blow usually bounces off. That bounce can cause injury. When the rock does break, the impact often yields sparks and sharp pieces of rock traveling at high velocity. Be certain that nearby field partners are warned and safely away. Hold the base of your goggles with your free hand before striking the rock. That will protect the lower half of your face from sparks and sharp flakes of high velocity rock. You have been warned. A kitchen island countertop made of quartzite. In the dimension stone industry, some quartzite is sold as "granite" because in that industry, any hard silicate rock is often called "granite. Quartzite was often used as a tool by early people. It is durable enough for use as impact tools such as hammerstones. It breaks with a conchoidal fracture, which made it useful for tools with sharp edges, such as hoes, axes, and scrapers. Although it is very difficult to knap, some ancient people were able to knap it into knife blades and projectile points. The photo shows a quartzite arrowhead found in Alabama. If the arrowhead is turned under a bright light, the grains in the quartzite produce a sparkling luster. Uses of Quartzite Quartzite has a diversity of uses in construction, manufacturing, architecture, and decorative arts. Although its properties are superior to many currently used materials, its consumption has always been low for various reasons. The uses of quartzite and some reasons that it is avoided are summarized below. Architectural Use In architecture, marble and granite have been the favorite materials for thousands of years. Quartzite, with a Mohs hardness of seven along with greater toughness, is superior to both in many uses. It stands up better to abrasion in stair treads, floor tiles, and countertops. It is more resistant to most chemicals and environmental conditions. It is available in a range of neutral colors that many people prefer. The use of quartzite in these uses is growing slowly as more people learn about it. Construction Use Quartzite is an extremely durable crushed stone that is suitable for use in the most demanding applications. Its soundness and abrasion resistance are superior to most other materials. Unfortunately, the same durability that makes quartzite a superior construction material also limits its use. Its hardness and toughness cause heavy wear on crushers, screens, truck beds, cutting tools, loaders, tires, tracks, drill bits, and other equipment. As a result, the use of quartzite is mainly limited to geographic areas where other aggregates are not available. Manufacturing Use Quartzite is valued as a raw material because of its high silica content. These are mined and used to manufacture glass, ferrosilicon, manganese ferrosilicon, silicon metal, silicon carbide, and other materials. Decorative Use Quartzite can be a very attractive stone when it is colored by inclusions. Inclusions of fuchsite a green chromium-rich variety of muscovite mica can give quartzite a pleasing green color. If the quartzite is semitransparent to translucent, the flat flakes of mica can reflect light to produce a glittering luster known as aventurescence. Material that displays this property is known as " aventurine ," a popular material used to produce beads, cabochons, tumbled stones , and small ornaments. Aventurine can be pink or red when stained with iron. Included dumortierite produces a blue color. Other inclusions produce white, gray, orange, or yellow aventurine. Stone Tools Quartzite has been used by humans to make stone tools for over one million years.

ROCKS AND STRUCTURE OF THE QUARTZ SPRING AREA pdf

A few words about William Shakespeares plays Difference between full wave and bridge rectifier Music and the institutions Joseph J. Ryan West Victoria Separation Movement (Australia Felix Series) Intentional action : two-and-a-half folk concepts? Fiery Cushman Alfred Mele Teaching and parenting gifted adolescents Event or situation (short or long term of exceptionally threatening or catastrophic nature. And, Radical Praise Its Not Business As Usual The grounds of faith Business plan for financial advisor The logical structure of cognition A dictionary of business and management. Learning from error The Kingsway histories for seniors Salt of the Desert Sun Eu3000is honda generator manual filetype 13th reality series Should there be a / Teaching the disadvantaged child. Research methods in biomechanics second edition Ms dynamics crm 2015 tutorial Vector mechanics for engineers 10th Toward an Alternative Theology International political economy frieden 6th edition Origins of process thought Coronation Street, early days Introduction : war without exits As a consuming fire, wisdom Toefl practice barrons Oxford dictionary latest edition 2017 Heart of an Apostle Word Processing for the Modern Business Bridges to the Future Bewitching Imposter Aisc steel construction manual 14th edition part 1 Corporate inroads in librarianship : the fight for the soul of the profession in the new millenium by Pet A Practitioners Guide to Managing Projects in the Information Class experience and conflict in a feminist workplace : a case study Sandra Morgen Passing of Normalcy Artemis to Actoeon and other verse