

Azurite $[\text{Cu}_3(\text{CO}_3)_2(\text{OH})_2]$

Azurite and Malachite, two closely related copper ores, are two “peas in a pod” in the geological world. Often found with one another, azurite and malachite differ only by the ratio of copper to carbonate in their chemical composition. Azurite is a secondary mineral, forming in the upper oxidized portion of copper deposits. Malachite occurs when less copper is present than needed to form azurite in the oxidized deposit. Therefore, malachite has a lower copper to carbonate ratio than azurite. The stunning “copper caviar” shown on the right exhibits both copper ores, highlighting how minute differences in composition can change the mineral completely. ^{B45}



Azurite and Malachite



Azurite Sun $[\text{Cu}_3(\text{CO}_3)_2(\text{OH})_2]$



Large circular, distinctive growths of azurite, or “suns” are found in one location in the world at the Malbunka Copper Mine near Areyonga, Australia. This particular crystal habit was formed by groundwater carrying dissolved copper through the bedded kaolinite clay layers. Copper and carbonate in the groundwater nucleated around quartz impurities within the kaolinite clay. The chemical reactions and crystallization occur along bedding planes and grow evenly outward from the point of nucleation. The Malbunka Copper Mine is closed to the public, thereby making azurite ‘suns’ scarce in the mineralogical world. P4

