



Azurite

&

Malachite

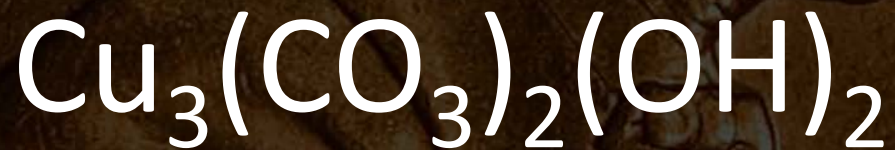
The Copper Carbonates

Bruce Kelley
© 2013

Azurite

“Azure” derived from the Persian name of the place in Afghanistan where lapis lazuli was found : Lazheward.

Chemically, Copper Carbonate Hydroxide:



Crystal form is Monoclinic-Prismatic

Azurite Formation

A secondary copper mineral found in oxidation zones.

Primary copper ores such as

- chalcocite (Cu_2S),
- covellite (CuS),
- chalcopyrite (CuFeS_2)

are oxidized by solutions with dissolved carbon dioxide.

Also, when solutions containing copper react with calcite such as limestone.

Azurite Properties

Hardness: 3.5 to 4

Density: 3.8

Streak: Light blue

Color: Blue, blue, blue.

Azurite is somewhat unstable in open air, and can turn into malachite, which is more oxidized and more stable.

Malachite

Chemically, Copper Carbonate Hydroxide:



Crystal form is Monoclinic-Prismatic

Malachite Formation

A secondary copper mineral found in oxidation zones.

Forms in a similar fashion to Azurite if there is more CO_2 available in solution and the pH is more alkaline.

Can also be pseudomorphed directly from azurite.

Malachite Properties

Hardness: 3.5 to 4

Density: 3.6 to 4.0

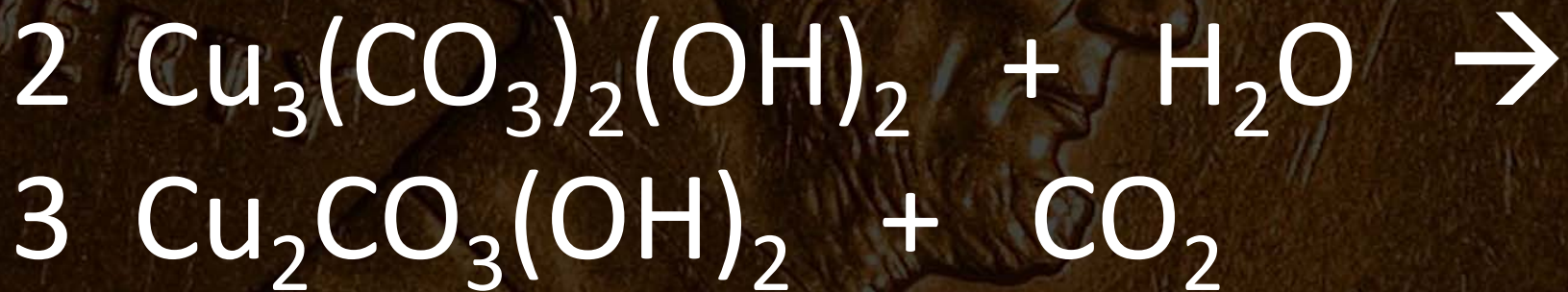
Streak: Light green

Color: Green

The color difference comes from the increased oxidation.

Pseudomorphs

Chemical and crystal change from Azurite to Malachite. Keeps the same general crystal shape.



Azurite + Water \rightarrow
Malachite + Carbon Dioxide

Azurite and Malachite

4650 level (Copper Mt. Extension) of the Morenci Pit,
Morenci, Copper Mountain District, Shannon Mts,
Greenlee Co., AZ





Azurite

Morenci Mine, Morenci, Copper Mountain District,
Shannon Mts, Greenlee Co., AZ





Azurite and Malachite

Bisbee, Warren District,
Mule Mts, Cochise Co., AZ





Azurite

Lost Lake claim, Nacimiento Mine,
San Pablo, Sandoval Co., NM





Azurite & Chrysocolla

Valmy, Iron Point District,
Humboldt Co., NV





Azurite & Chrysocolla

Valmy, Iron Point District,
Humboldt Co., NV





Azurite

Morocco





Azurite and Malachite

Oujda-Angad Province,
Oriental Region, Morocco





Azurite and Malachite

Oujda-Angad Province,
Oriental Region, Morocco

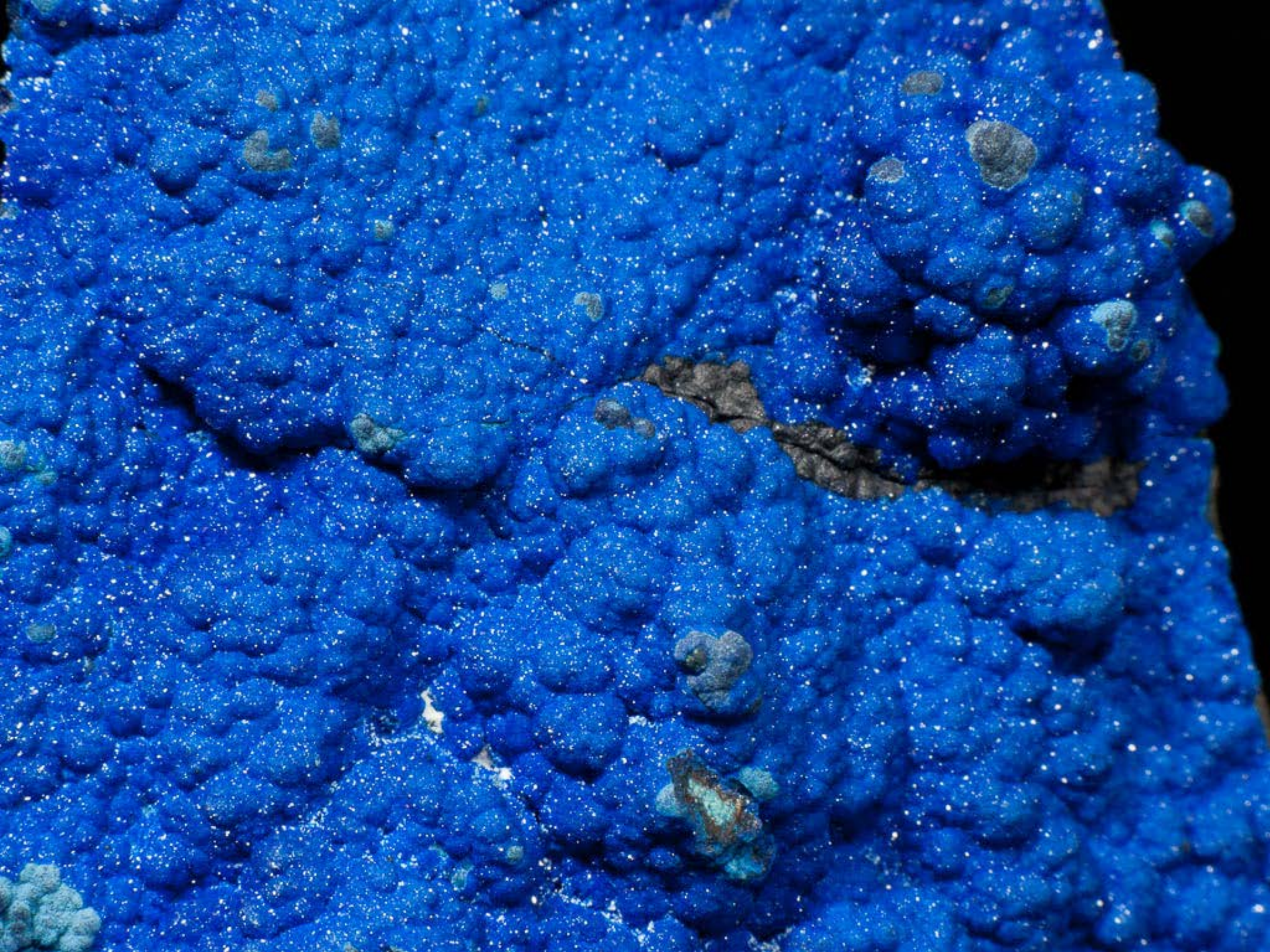




Azurite

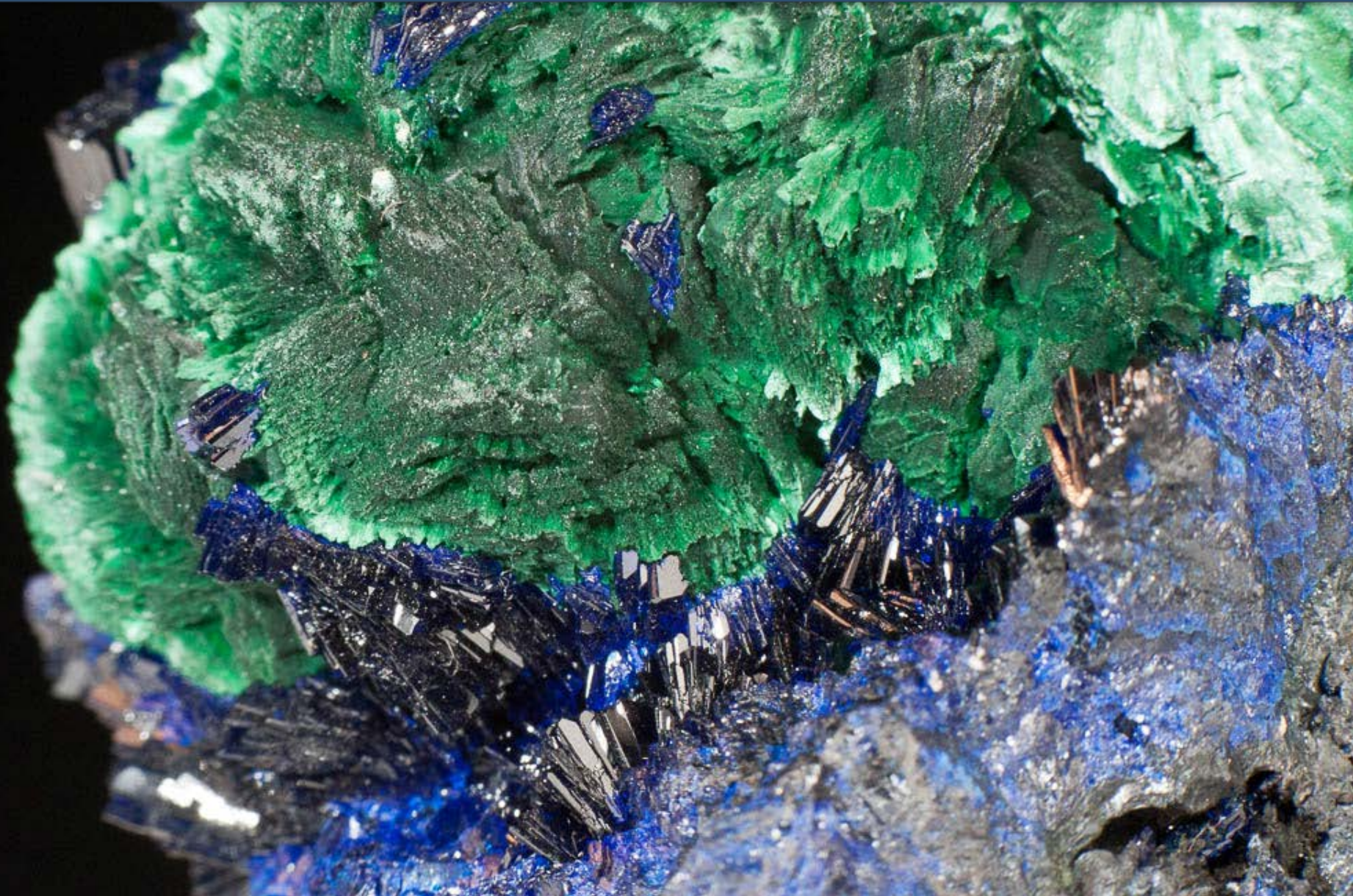
Aouli-Mibladen, Upper Moulouya lead district,
Midelt, Khénifra Province, Meknès-Tafilalet Region,
Morocco

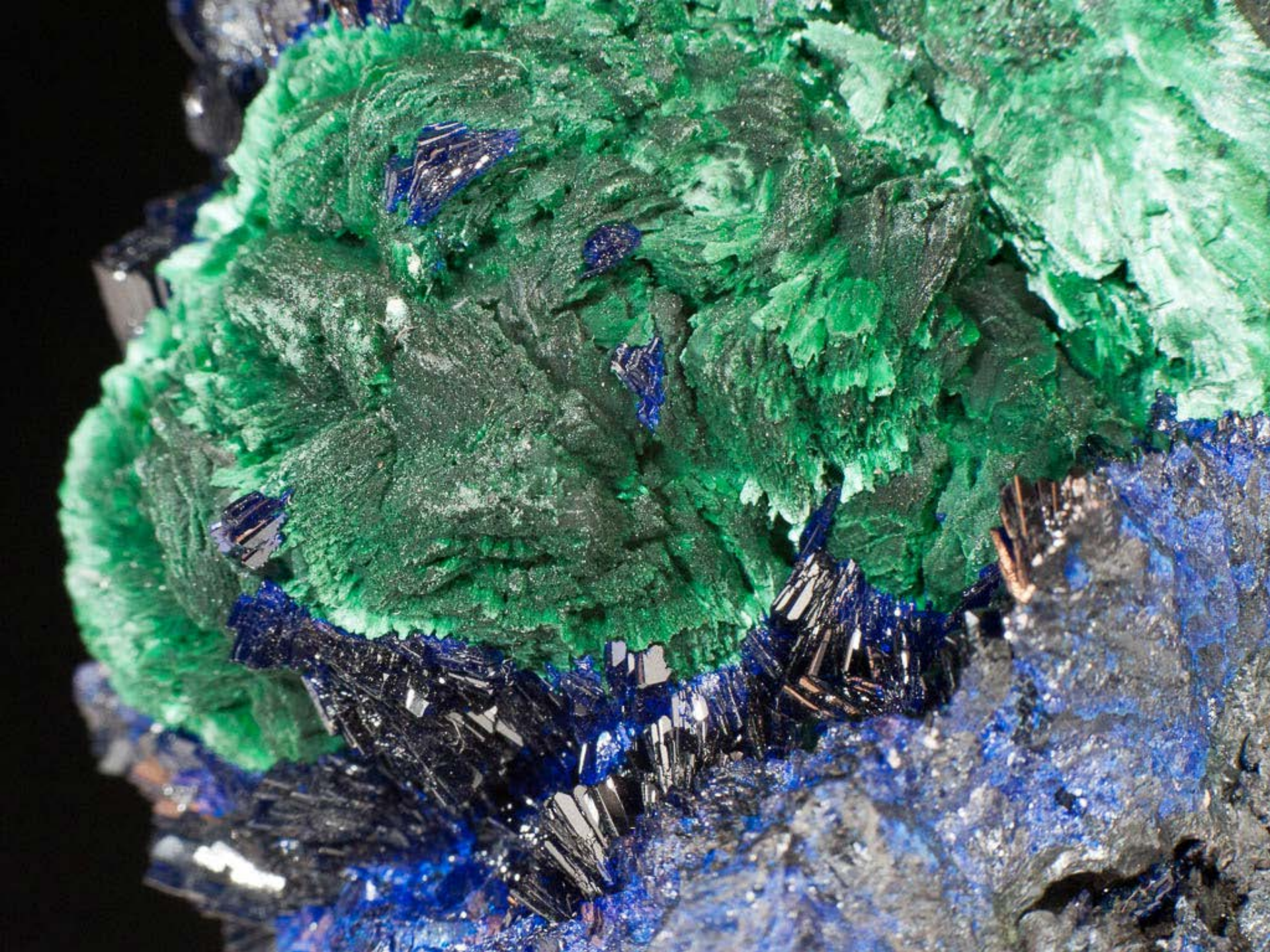




Malachite and Azurite

Sidi Boubeker, Morocco





Azurite

Sidi Boubeker, Morocco





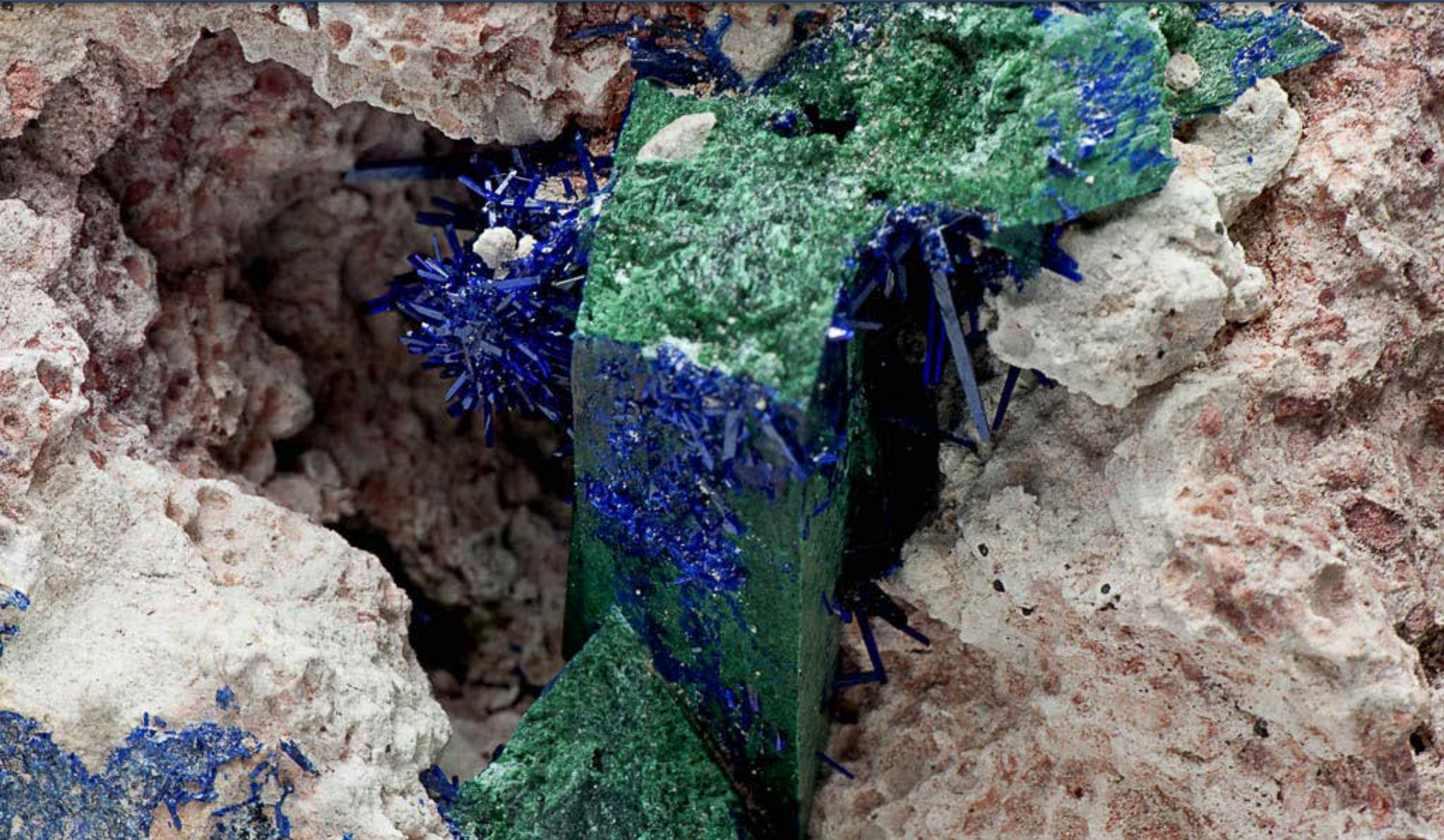
Azurite

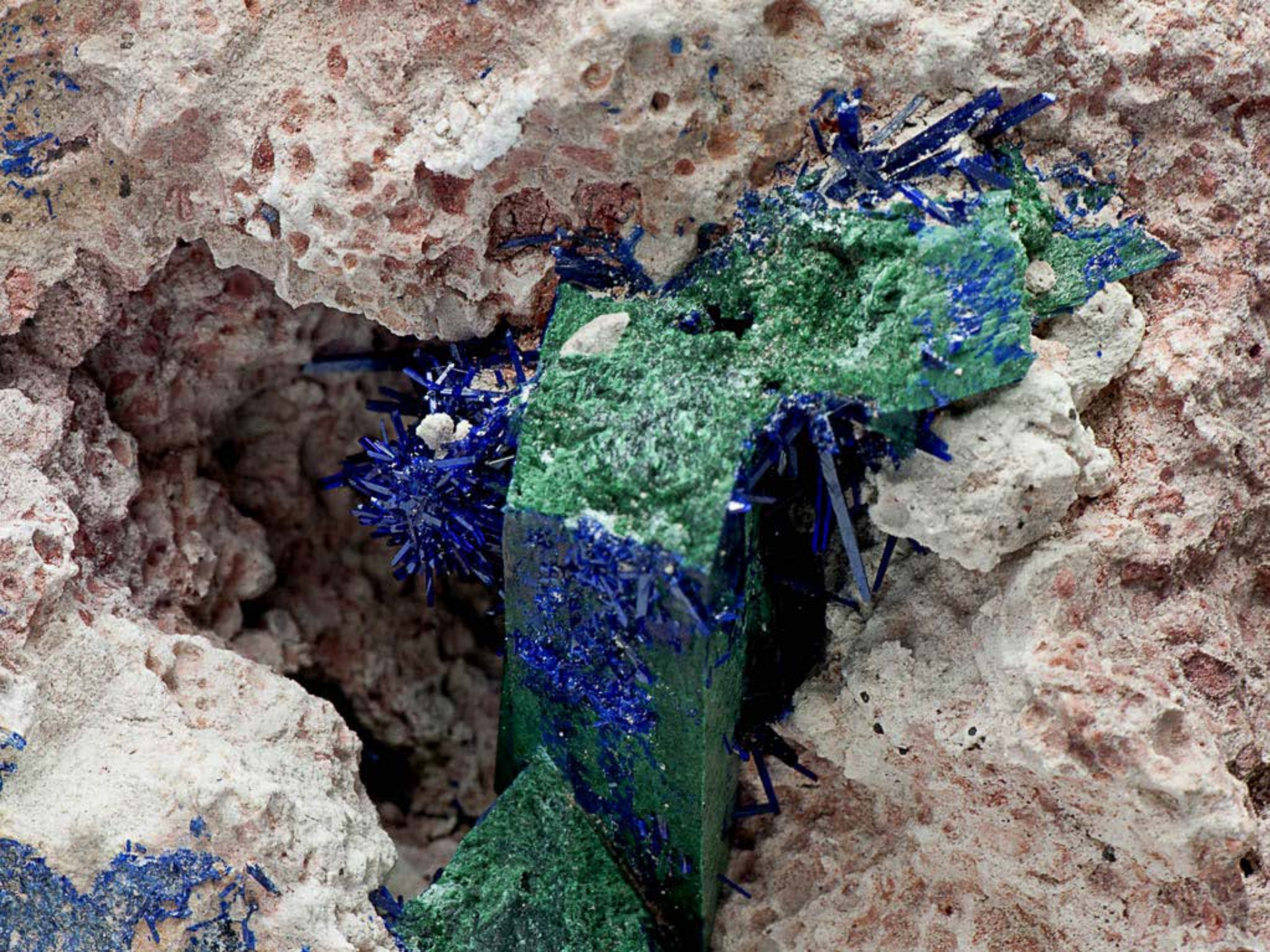
Sidi Boubeker, Morocco





Malachite after Azurite and 2nd Generation Azurite
Kerrouchene, Khénifra Province,
Meknès-Tafilalet Region, Morocco





Azurite

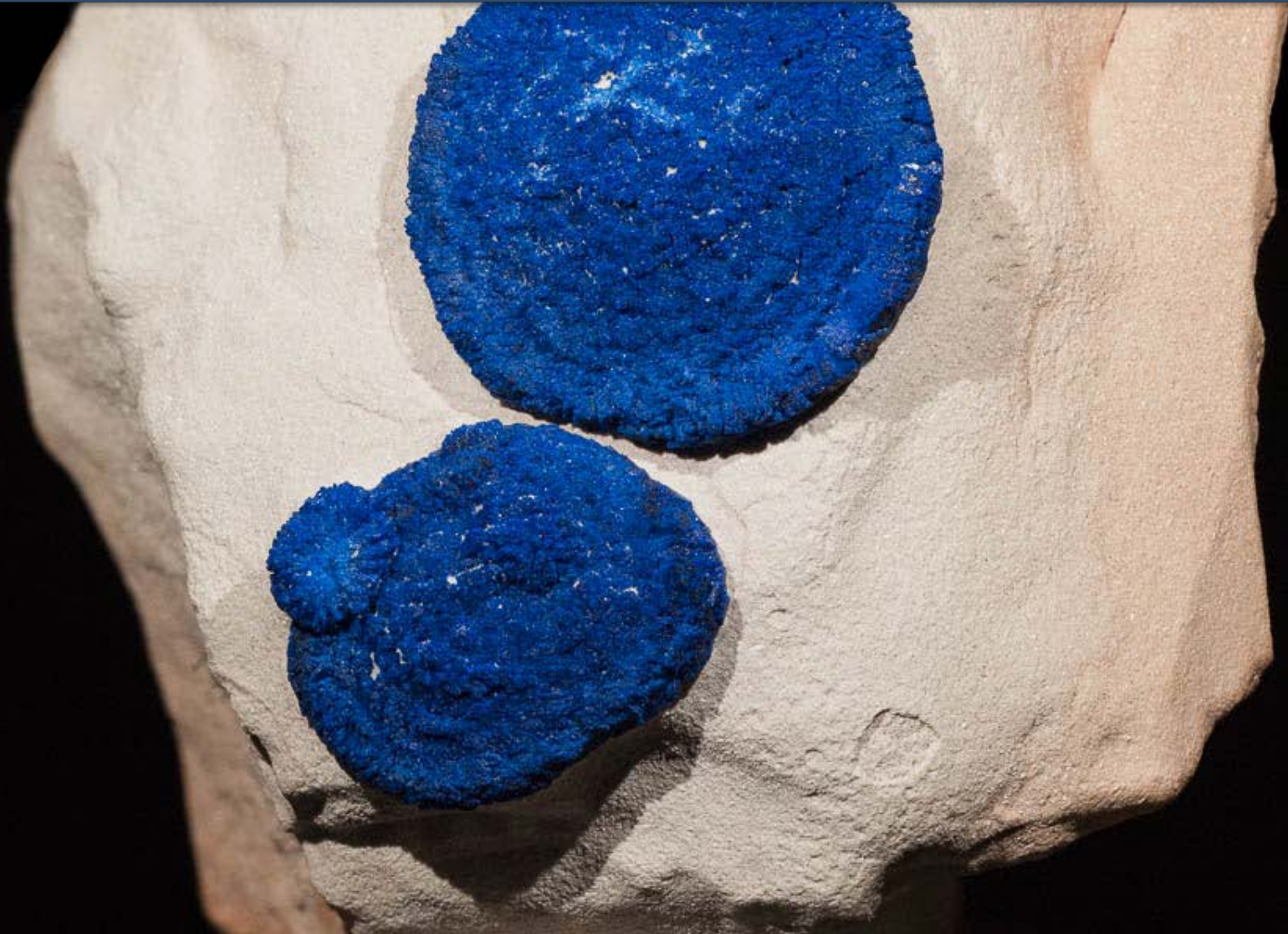
Tsumeb Mine, Tsumeb,
Otjikoto Region, Namibia





Azurite on Kaolin

Malbunka Copper Mine, Areyonga, Alice Springs,
Gardiner Range, MacDonnell Shire, NT, Australia





Azurite on Kaolin

Malbunka Copper Mine, Areyonga, Alice Springs,
Gardiner Range, MacDonnell Shire, NT, Australia





Malachite after Azurite

Milpillas Mine, Mun. de Santa Cruz,
Sonora, Mexico

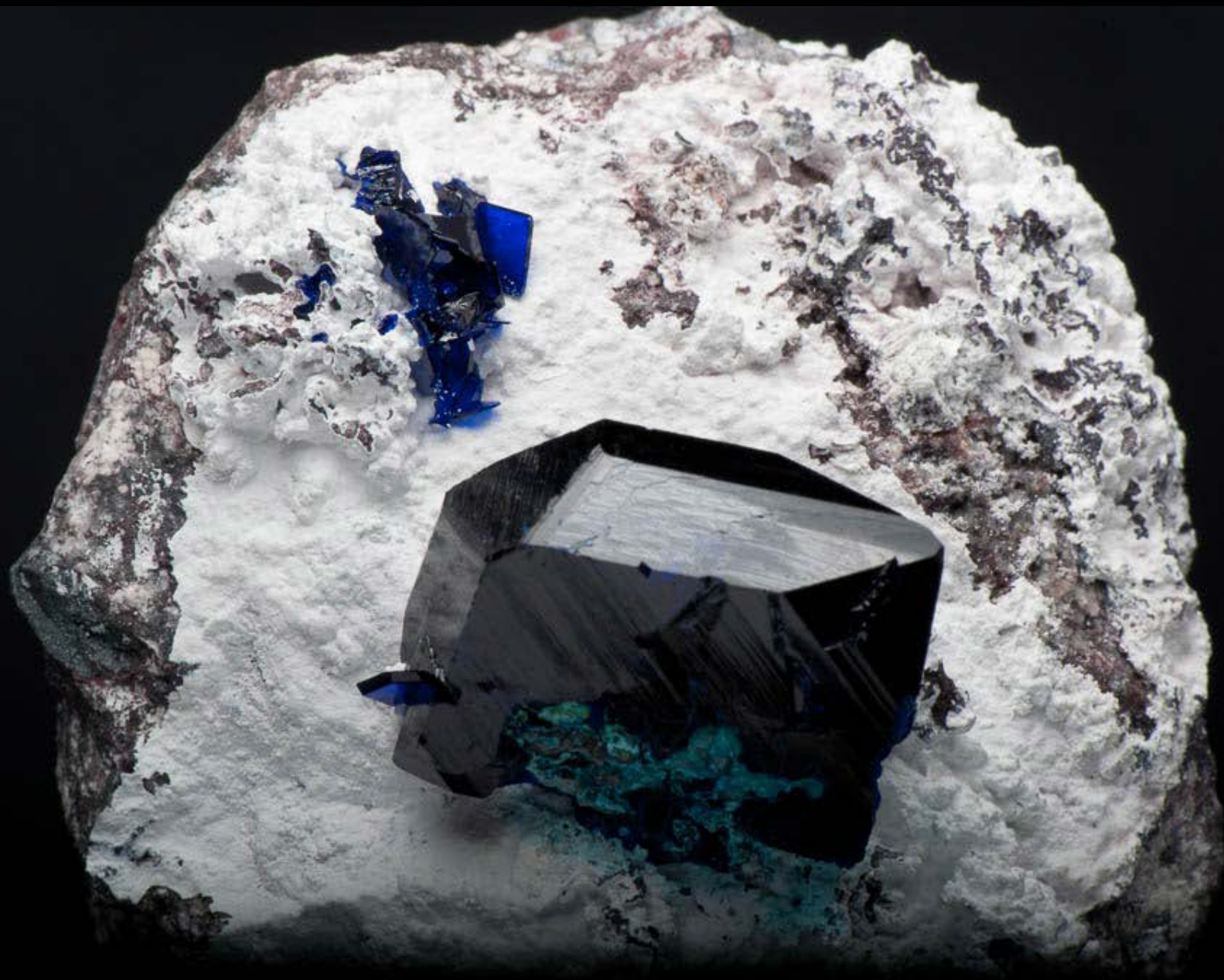




Azurite

Milpillas Mine, Mun. de Santa Cruz,
Sonora, Mexico





Azurite and Malachite

Milpillas Mine, Mun. de Santa Cruz,
Sonora, Mexico





Malachite pseudomorphing to Azurite

Milpillas Mine, Mun. de Santa Cruz,
Sonora, Mexico

