

Magnesite in Yemen

Yemen hosts large and very pure magnesite deposits of Precambrian age. Compositionally the magnesite is comparable to magnesite deposits exploited in other countries, and the Yemeni magnesite occurrences are thus believed to have a good potential for future exploitation.

Geological setting

The most promising area is the Precambrian Al-Thaneyya belt occurring in central Yemen. The belt is composed mainly of metamorphosed magnesite-rich carbonate rocks, which are interpreted to represent carbonate platform deposits.

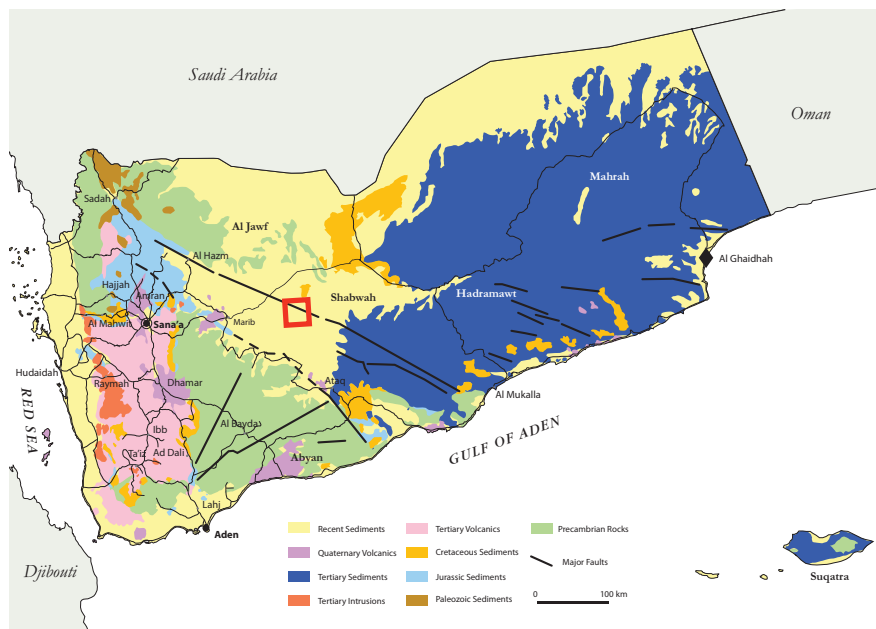
The belt is subdivided into six stratigraphic units:

- Unit-A: Massive magnesite rocks
- Unit-B: Crystalline green-schist
- Unit-C: Massive magnesite rocks
- Unit-D: Thick bedded magnesite-carbonate rocks
- Unit-E: Thin bedded carbonate-schist rocks
- Unit-F: Thick bedded magnesite-carbonate rocks.

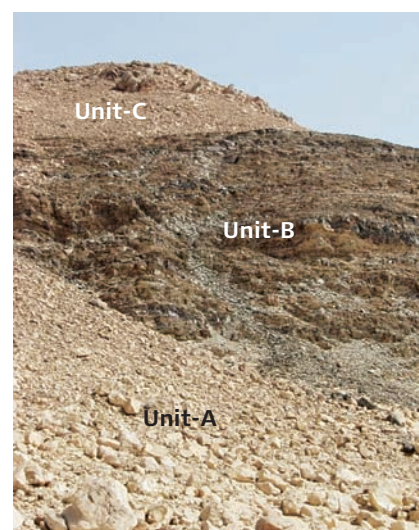
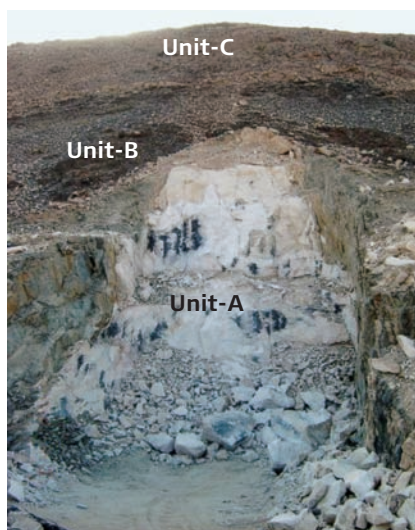
The main productive layers of magnesite mineral are units A and C. These units are composed of coarse, perfect, euhedral, subhedral and sometimes mega crystals of magnesite.

The magnesite rocks are white, off-white, red, yellow, black and grey in colour. The magnesite beds range in thickness from 20 to 40 m.

The lower limit of the metamorphic carbonate sequence is not exposed, but buried under recent sand dunes.



Geological sketch map of Yemen. The red square indicates the area of most promising magnesite occurrences.



Magnesite occurrence with some of the sub-units in the Al-Thaneyya belt.

Sample No.	Major oxides%								Total%
	Al ₂ O ₃ %	CaO%	MgO%	Fe ₂ O ₃ %	SiO ₂ %	Na ₂ O%	K ₂ O%	LOI	
TH-4/S1	0.34	0.54	45.6	0.37	3.21	0.22	0.01	49.55	99.86
TH-5	0.4	0.48	45.39	0.38	3.59	0.11	0.01	49.49	99.86
TH-6/S1	0.28	1.34	43.76	0.3	5.98	0.18	0.01	47.99	99.88
TH-7/S1	0.28	0.09	43.69	0.19	4.84	0.84	0.01	48.74	99.81

XRF analyses of a large number of samples of magnesite-bearing rocks show that the magnesite content is very high.

Sample No.	Calcite	Quartz	Dolomite	Magnesite	Smectite	Brucite	Talc
Th-S-1	•	-	•	•••	•	-	•
Th-3	•••	••	-	-	•	-	-
Th-4/S3	-	-	•••	-	•	•	-
Th-5	•	-	•	•••	•	•	-
Th-8	-	-	•••	-	•	•	•
Th-7	-	•••	•••	•	-	-	•
Th-2	-	•••	•••	-	•	•	-
Th-7/S2	-	-	•••	•	•	•	•
Th-4	•	-	•	•••	•	•	•

XRD analytical work on the mineralogy of the magnesite rocks indicates that magnesite in some of the layers is the main component. Sample location: From Marib governorate, the Al-Thaneyya area.

Potential occurrences of Magnesite

The presence of magnesite was not realised until fairly recently. The occurrences were previously quarried for marble until it was realised that they contained high amounts of magnesite. Although no mining is taking place, the potential seems promising. The Al-Thaneyya region includes two major belts trending N-S.

The belts are from south to north:

The Fariedah belt

The belt consists of three small anticlinal mountains surrounded by sand dunes. The southern Fariedah is 0.5 km long,

200 m wide, and 30–40 m high. The middle Fariedah is more than 1 km long, 250–300 wide, and 60–80 high. The northern Fariedah is about 1 km long, 300–400 m wide and 90–100 m high.

The Al-Thaneyya belt

Al-Thaneyya belt is 13 km long, 300–1300 m wide and 90–135 m high. Important, thick, massive and highly pure magnesite units (Units A and C) are exposed in the lower and middle parts. These units are composed mainly of white, very large crystals of very pure magnesite. Their unit thickness ranges from 20–40 m.



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