

Bill's Rocks and Minerals

Barite / Baryte / Barytes.

In the past, there has been some confusion whether to name the mineral barite, baryte, or barytes. The International mineralogical association (I.M.A.) has decided to use the name baryte as standard, which is the English version. The Americans aren't too happy that it

Tabular crystals of Baryte



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was chosen over barite, which was their version. An old fashioned term for baryte, which is sometimes used, is "heavy spar". The Greek word for heavy is barus from which baryte derives its name. Baryte is the principle ore of barium, with the formula $BaSO_4$ (barium sulphate).

The most striking physical attribute of baryte is its heavy weight. This is very noticeable on handling a specimen. It has a specific gravity (S.G.) of 4.5. This is greater than quartz which has an S.G. of 2.65. Even though it is very dense it has a very low hardness of 2.5 on the Mohs scale, again compared with quartz which has a hardness of 7.

An important feature of baryte is that it is insoluble in water making it particularly useful when it is used as an additive in many manufacturing processes, including paints, electronics, T.V. screens (not so much now), rubber, cosmetics, and paper. High quality playing cards have quite a high content of baryte to give them extra weight, and make them easier to deal. However, the bulk of baryte produced, 77%, is used as a weighting agent in oil and gas drilling heads, where it is mixed with muds, and pumped down the drill stem where it exits and returns to the surface in the space between the drill stem and the well wall, carrying rock fragments from the drilling process as it does so.

It is also used to make barium compounds which are used in the shielding of x-ray and gamma ray equipment in commercial and hospital use.

Diagnostically, barium is used as an additive in drinks and enemas to highlight soft tissue which would otherwise be difficult to image.

The uses of Baryte

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| Oil and Gas drilling industry. | 69% |
| Chemical Industry, Ceramics, Electronics, Glass Industry. | 15% |
| Filler in Rubber, Paint, Paper, Filler in Radiation shielding. | 16% |

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China and India are the worlds leading suppliers of baryte. The U.S. produces only about 25% of its domestic requirements, and so it is a major importer, whereas the UK is self sufficient with major mines in Scotland, and smaller mines in the North Pennines.

The major mines in Scotland are Foss mine and Duntalich mine. The Foss mine was the first to produce baryte in large quantities, but since plans were approved in Sept 2016 to open a mine at Duntanlich, near Aberfeldy with its estimated reserves of 7.5 million tonnes, the UK needs for the next 50 years are assured. The mine is planned to open in spring 2018 and will produce about 3 times the amount of the Foss mine.

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20cm.

Cockscomb variety of Baryte, Bryntail mine.

The origin of Baryte in the Foss and Duntanlich mines is from sedimentary deposits in large scale recumbent folds in the southern outcrop of the Dalradian sediments. When black shale was being deposited under anoxic conditions, metal rich hydrothermal brines were injected into the sediments, releasing the various minerals, of which baryte is one. The source of the heat which prompted this process was related to the Tayvallich volcanism 600Ma.

Baryte is also common as concretions in limestone and dolostone. When these carbonate rocks are heavily weathered, large accumulations of baryte can sometimes be found at the bedrock-soil contact. A number of mines exploit these residual deposits.

A totally different source of baryte is from hydrothermal ore deposits. For example, the Bryntail mine in the Central Wales Ore field produced several

thousand tons of baryte in sporadic activity from such a source in the second half of the 19th century. This is just one example of many mines scattered throughout the UK, especially central Wales, Shropshire, and Pennine ore fields.

Desert Rose



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Sandstones can also be bearers of baryte, indeed some sandstones are so rich in baryte that it acts as a cement for the sandstone. It is from the baryte rich sandstone that interesting growths of baryte known as desert roses are found. These are formed as baryte crystals incorporate sand grains in their growth.

Baryte crystals are classed in the orthorhombic system, and in the dipyramidal crystal class. Its crystal habit is tabular, and varies in colour with yellow, red, and green varieties, caused by trace elements of other minerals. It can be found in its pure state as completely colourless and transparent.

Groups of plates can form fan shapes to create the varieties known as "cockscomb", or rosettes "desert roses", which are common in Oklahoma, and the Sahara desert.

"Bologna Stone" is a variety of baryte found in nodular-fibrous, radial formation or concretions on the hills around Bologna Italy with the Argille-Scagliose Formation.

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Bologna Stone cross section. The University of Bologna/Creative Commons.

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Radiating crystals Isle of Sheppey, Kent.

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Barytes, Gorn Mine, Llanidloes