

Barytes

An Industrially Useful Mineral Abundantly Available in India

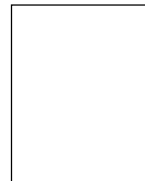
V Raghu

Barytes is a naturally occurring barium sulfate mineral. A significant portion of the total known reserves in the world is found in Andhra Pradesh. By virtue of its high specific gravity, barytes is extensively used as drilling mud in oil well industry. Further, barytes is also widely used in glass, paint and chemical industries.

Among the various non-metalliferous minerals, barytes has a wide industrial use. Barytes, a naturally occurring barium sulfate, is principal among the few barium minerals that are used commercially. It is the most widespread anhydrous sulfate after anhydrite. Barytes is also known as barite, heavy spar, bar, tiff and baryta. The term barytes is derived from the Greek 'baros', meaning heavy; the high specific gravity of the mineral is even felt by the hand.

Barytes is a sulfate of barium with chemical formula, $BaSO_4$ (BaO 65.7% and SO_3 34.3%). Barytes contains little or no soluble salts and is insoluble in water and acid. Pure barytes is white opaque to transparent but impurities cause a wide variation in colour. It is chemically inert and has a high density. It crystallizes in normal class orthorhombic barytes type with rhombic dipyramidal symmetry. Crystals commonly have tabular habit and some have prismatic, columnar, and sometimes globular, massive, rosette, fibrous, and crystal forms.

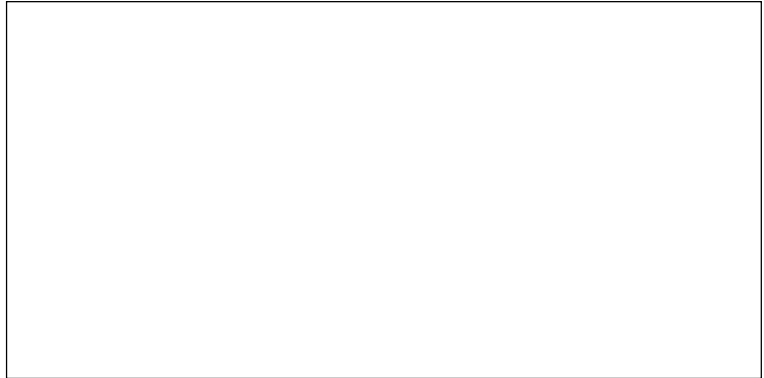
The mineral has perfect cleavage, brittle with an uneven fracture. The hardness varies from 3 to 3.5 on Moh's scale. The specific gravity of pure barytes is 4.5 and this can vary downward, depending on the impurities present. The mineral has white streak with the lustre inclining to resinous.



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Figure 1. Snow white barytes from Vemuta area, Cuddapah District, A.P. chiefly used in glass, paint and chemical industries.



In nature, barytes is generally of hydrothermal origin and sometimes by leaching of barium compounds from rocks. As an accessory mineral it is found in many sulfide, manganese, iron and other ores. Barytes is also widespread in sedimentary rocks as concretions.

The world's leading producers are India, USA, Russia, Germany, Mexico, Ireland, Peru, Thailand, China, Italy and North Korea. In India, Andhra Pradesh contributes over 98% to the total production of barytes. The world's largest bedded barytes deposit (*Figure 1*) was recently discovered in Mangampeta of Kodur taluk, Cuddapah district. This reserve contributes about 28% of the total known reserves of barytes in the world. In addition, barytes also occurs in Rajasthan, Madhya Pradesh, apart from minor occurrences in Himachal Pradesh, West Bengal, and Tamilnadu.

Barytes is widely used in many industries, e.g. oil, glass, paint and chemical industries. In the oil industry, barytes is chiefly used as drilling mud. Rotary drilling is generally adapted for development of oil fields in which circulation of drilling fluid or mud is a main feature. As the drill bit of the oil rig grinds its way towards the core of the earth in search of oil, the bit has to be cleaned, flushed and lubricated. The main functions of drilling fluids or muds are (a) to cool and lubricate the drilling bit and drilling string, (b) to remove cuttings from the bits and to transport them to the surface, (c) to have thixotropic or gelling



properties so that in the event of a pump failure, the mud will gel and hold all the cuttings in suspension, (d) to cement the open wall of the well to counteract any tendency for a loose formation to cave into the well, (e) to control the pressure in the well by virtue of the mud's high specific gravity and to prevent a well running wild in the event of oil or gas being met under pressure and (f) to reduce the friction in the drilling string.

Barytes crushed to pass through 2.00 to 0.840 mm sieve mesh is employed in the production of homogenized glass as a flux and to add brilliance and clarity to the product. Bleached ground barytes has been used as a pigment in several ways: as the natural white sulfate and as blanc fixe in lithophone as an indicator in medical X-ray photography. It is also used as a filler in oil cloth, linoleum, rubber, X-ray proof plaster, and brake linings, clutch facings, rope finishes. It is added to bristol board, heavy printing papers and even playing cards.

In the construction industry, some barytes is used in concrete aggregate to weigh down pipeline buried in marshy areas and to shield nuclear reactors. About 10% of barytes is used with rubber and asphalt in a paving mixture suitably durable for parking lots, roads, and airport runways.

The extraction and processing of petroleum remains a major industry in both industrialised and developing countries. The prosperous barytes industry is solely dependent upon continued high rates of oil well drilling. At present, the demand for drilling mud is accelerating with good pace. Significant increases in the use of barium in glass, paint, and chemical industries are expected to continue at high levels. Other industrial uses of barytes are sure to consume barytes at demanding rates as new countries industrialise, and as economies expand in the already industrially developed countries. Thus, barytes will continue to play a vital role in various industries.

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