

# Diyodar meteorite was India's first aubrite in 170 years

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**In news– Meteorite streaked over India in August, 2022,** breaking apart as it descended through the air, to scatter over two villages in Banaskantha, Gujarat was India's first aubrite in 170 years.

## **About Diyodar meteorite**

- It stuck over two villages in Banaskantha of Gujarat, one piece struck a neem tree in Rantila village and shattered into several pieces. Another landed on the porch of a house in Ravel village, 10 km away, and met a similar fate.
- Analysis by a group of scientists at the Physical Research Laboratory (PRL), Ahmedabad, has revealed that this **meteorite is a "rare, unique specimen" of aubrite.**
- India has been the site of hundreds of meteorite crashes, **but this is only the second recorded crash of an aubrite. The last was on December 2, 1852, in Basti, Uttar Pradesh.**
- **Worldwide, aubrites have crashed in at least 12 locations since 1836,** including three in Africa and six in the U.S.
- According to the 'Encyclopedia of Physical Science and Technology' (2003), **aubrites "are coarse-grained igneous rocks that formed" in oxygen-poor conditions,** and thus **"contain a variety of exotic minerals that are not found on Earth".**
- **For example, the mineral heideite was first described in the Basti meteorite.**
- **Meteors are pieces of some solid object in space that broke away, descended onto a planet or moon, and managed**

to reach the surface.

- **Once on the surface, they are called meteorites. Aubrites are a type of meteorite;** scientists are not yet sure of their origin, although some signs indicate that they could be from the asteroid 3103 Eger or from the planet Mercury.
- **The pieces that fell in the two villages have been dubbed the Diyodar meteorite, after the taluka in which the villages are located.**
- The PRL group obtained two fragments weighing 200 g and 20 g. They used a gamma-ray spectrometer, a spectroradiometer, electron-imaging, and chemical analyses to determine their mineral composition.
- **They found that the fragments shared a crust that indicated they were part of the same larger rock.**
- **Around 90% of the meteorite was composed of orthopyroxene.**
- **Pyroxenes are silicates consisting of single chains of silica tetrahedra** ( $\text{SiO}_4$ ); orthopyroxenes are pyroxenes with a certain structure.
- **Pyroxenes such as diopside and jadeite have been used as gems.**
- **Spodumene was historically used as lithium ore.** Rocks with pyroxene have also been used to make crushed stone that is used in construction.
- They also noted that the pyroxene didn't contain any iron but was rich in magnesium.
- **The group also classified the meteorite as a monomict breccia, meaning that it consisted of several pyroxene-bearing pieces** held together by a scaffold of rocky material.
- Overall, they suggested that the meteorite is an aubrite.
- **The conditions in which aubrites form are prevalent on the surface of Mercury;** however, the researchers wrote that they "don't have any known Mercurian samples in our collection".

- So, they continued, the Diyodar meteorite “not only improves the existing meteoritic database but will be important for understanding planetary processes in the future.”