

# Report for the Joint Use/Research of the Institute for Planetary Materials, Okayama University

2022 fiscal year first term / second term / others

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**Category:** International Joint Research/ General Joint Research/ Joint Use of Facility/ Workshop

**Name of the research project:** Precise oxygen isotopic analysis of a new fall meteorite

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## Research report:

A meteorite fall is witnessed by the local residents of villages Rantila and Ravel of Diyodar Taluka, Banaskantha district, Gujarat, India on 17<sup>th</sup> August, 2022. A group of PRL scientists visited the fall areas and collected two fragments (~200 g and ~20 g) from the Tehsildar office at Diyodar on 23<sup>rd</sup> August, 2022. The hand specimen of the meteorite fragments appears as fragmental and are apparently similar in look collected from both locations, suggesting the fragments are likely part of a single meteorite mass before breaking during its passage through the Earth's atmosphere. A light brown fusion crust is partly preserved over small areas in both the fragments, which indicates that the fragments are part of a bigger meteorite chunk. The sample is a stony achondrite breccia with a predominant constituent of white pyroxene grains of various size and shape. Results from reflectance spectroscopy obtained at the PRL revealed that the bulk meteorite sample is typical of Mg-rich pyroxene enstatite. The mineral grains are extensively fractured. The dominant mineral phase is enstatitic pyroxene, while diopsidic pyroxene is also present as the next dominant phase. Olivine is forsteritic, and plagioclase is albitic. The sample contains various sulfides. Our preliminary description and study suggest that the meteorite is a rare, unique specimen of Aubrite.

The purpose of this collaboration research is a preliminary study by oxygen isotope analysis of the new aubrite meteorite is needed for the initial classification. The oxygen isotope data obtained in this project indicates that this meteorite is within the range of aubrite. Based on the obtained results including this collaboration research, we are now preparing to submit a paper to an international journal.