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Research Article

Analyzing Amethyst Crystal Stones at the Bandung Geology Museum

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Abstract: Amethyst crystal is one type of rock that is widely studied in the field of geology, especially because of its beauty and interesting formation process. Amethyst is a variety of quartz mineral (SiO2) that is purple in color due to the presence of oxidized iron ions. As a mineral that is often used in jewelry, amethyst also has high economic value. The Geological Museum often displays amethyst crystals to provide more insight into the geological processes that occur beneath the earth's surface and the importance of recognizing various types of minerals and rocks. The purpose of exhibiting Amethyst Crystals at the Geological Museum is to provide information and knowledge to the public about the geological properties of Amethyst Crystals and their role in the world of geology and their formation process. The implications of Amethyst Crystals provide deeper insight into the geological and mineralogical processes to the public, thereby increasing understanding of the earth and nature.

Keywords: Amethyst Crystal, Geology Museum, Purple.

1. Introduction

Bandung Geological Museum is one of the institutions that play a role important in save and display riches Indonesian geology. Various type rocks, minerals and fossils from all over corners of the archipelago are collected and displayed in this museum. One of interesting collection attention visitors is a crystal stone amethyst, which is known will its beauty and value scientifically as part from formation geology. Amethyst is variety purple from the mineral quartz (SiO_2), which is formed through long and complex geological processes. The characteristic purple color of amethyst make it no only worth as material jewelry, but also important in the world of geoscience.

Amethyst at the Bandung Geological Museum becomes object study interesting because reflect riches Indonesia's geology is very diverse. These crystals show different structure, clarity, and color depending on location and conditions its formation. With do analysis against crystal stone amethysts on display in the museum, can obtained outlook more in regarding the geological processes that occurred , starting from temperature and pressure formation , accompanying mineral content , up to characteristics microscopic that affects color and quality crystal . This is important no only in context academic, but also in preservation and education geology for public.

Study this is also relevant for highlight how museums can become center learning and research scientific. Bandung Geological Museum is not only become place storage artifact geology, but also as laboratory open that can utilized by students, college students, and researcher For learn earth in a way directly . With lift one collection superior, namely crystal stone amethyst, it is hoped that this article can show that the museum is living space, not only place keep object dead.

On the other hand, amethyst also has mark cultural and economic. In various culture, amethyst trusted own energy metaphysical like serenity and clarity mind. However, from side scientific, important For place this stone as object geology that has structure crystalline and composition typical chemistry. Therefore that, research This will more focus on aspects

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scientific from crystal amethyst, in particular in context mineralogy and petrology, so that can avoiding the mystical bias that often occurs associated with rock glorious.

Study this is also trying answer question about How crystal amethyst formed, characteristics physical and chemical , as well as location distribution amethyst in Indonesia. With Thus, museum visitors do not only admire the beauty of the stone, but also understand how natural processes produce such a crystal captivating. Understanding kind of this important in grow appreciation to knowledge earth and conservation source Power nature.

Activity analysis this is also in line with the mission of the Bandung Geological Museum as means education and dissemination information scientific to public. Research This done For support function educational museum, which is not only convey information through labels and catalogs , but also provide understanding scientific through approach more analysis in-depth and systematic .

With notice various aspect said, then study This take title " Analyzing Amethyst Crystal Stones at the Bandung Geological Museum ." Research This expected can give contribution significant scientific in field mineral geology and at the same time become reference addition For education public in museums.Research This own similarity with Robi Robani's article Fingerprint with title article " Application of Fossil Costae Analogy and Architectural Vertebrae Biomorphics in Geo Paleontology Museum Design " published in 2020 at the Institute National Technology . Research This own similarity with Article by Fernanda Arianto , Raditya Eka Rizkiantono with title article " Design The book "Precious Stones in Indonesia" published in 2018 at the Institute Technology November 10th .

2. Proposed Method

Types of research used in work write scientific this is study descriptive qualitative, with approach observation field and study library. Approach This used For describe characteristics of crystal stone amethysts found in the Bandung Geological Museum deep , good from aspect physical, chemical , and background behind geological research . This No aiming test hypothesis, but dig information scientific that has available, then put it together become explanation complete and systematic about object of study.

Study this conducted at the Bandung Geological Museum located at Jalan Diponegoro No. 57, Cibeunying Kaler, Bandung City, west Java. Research time conducted in March 2025 with duration observation direct for two days. This museum chosen Because own crystal stone collection pretty amethyst complete and well maintained with good , and accompanied by information scientific that can help the analysis process . In addition, this museum also provides facility Supporter like guide and space very useful reading for support activity observation and data collection.

Data obtained through three technique main, namely observation direct, documentation, and study literature. Observation done with observe direct collection crystal amethyst in the mineral and rock room of the Bandung Geological Museum. Documentation done with take picture, note information from the collection label, as well as record explanation museum guide. Literature study used For compare field data with reference relevant scientific about amethyst, good from book geology, articles journal, as well as trusted online sources.

Data obtained analyzed in a way descriptive with compare results observation direct with literature geology about crystal amethyst. Characteristics physical stone like color, shape crystal , shine and clarity analyzed visually , while chemical and geological data analyzed based on explanation from relevant libraries . Data triangulation techniques were used. For increase validity results , namely with match information from observation field , museum information , and sources literature scientific . Observation focused on several aspect important , namely form crystal , color dominant , shiny surface , system crystallography , and possible formation processes . Crystalline rocks observed amethyst investigated from various corner For identify symmetry crystal , long axis , and the presence of inclusion . In addition , observations also include information origin the geography of the stone , because location formation is very influential to quality and characteristics amethyst .

3. Results and Discussion

Description of Amethyst Crystal Stone at the Bandung Geological Museum

Crystal stone Amethyst observed at the Bandung Geological Museum is displayed inside cupboard glass special together with some quartz minerals others . Specimens on display own color purple distinctive purplish , with gradation color from purple old until purple young in part end crystal . This crystal own form prismatic with end pointed indicating sufficient

growth perfect in system trigonal crystal . The label in the museum states that the stone originate from East Kalimantan, one of the areas known own potential of metal and non-metal minerals.

In general physical , crystal observed amethyst own smooth surface with vitreous luster or like glass . The purple color it has Enough evenly, even though there is A little variation gradation that shows the growth process crystals that are not uniform . This stone transparent with level clarity high , which indicates that the process of its formation in progress in a way slowly in cavity stable rock . Size crystal reaches 15 cm long and 6 cm wide , indicating that this stone including category crystal macrocrystalline . Amethyst on display formed in environment hydrothermal with pressure and temperature certain. Composition the chemistry still SiO_2, same like quartz usual , but color purple originate from footsteps iron (Fe^{3+}) in structure the crystal which then experience irradiation natural from gamma rays or ray radioactive in the surrounding area . This process cause shift color from clear become purple , which is highly valued Good in the world of gemology and also mineralogy .

Crystal stone amethyst from East Kalimantan describe potential Indonesia's vast geology in matter mineral diversity . Indonesia is a volcanic region active own Lots pocket hydrothermal which becomes ideal place for formation crystal like amethyst . Distribution amethyst in Indonesia no only limited to Kalimantan, but also found in several areas in Sulawesi, Papua, and even West Java, although in more amount A little .

Existence crystal amethyst in the Bandung Geological Museum is not only show mark aesthetics , but also value scientific . Through this stone , visitors can studying geological processes like crystallization , formation hydrothermal , and the influence element chemistry to color . Amethyst become means effective learning Because merge visual and scientific aspects that can interesting interest students and visitors general For know geology more in .

Amethyst is one of the variety from quartz mineral (SiO_2) which has color purple typical . This color caused by the existence of element iron (Fe) and irradiation experience in structure its crystals . According to Klein and Dutrow (2007), quartz is one of the most abundant minerals in the crust earth and have structure crystalline hexagonal . Varieties amethyst formed in cavities rock volcanic or sediment that allows growth crystal in a way slowly , allowing formation perfect structure and clarity high . Amethyst own level hardness 7 on the Mohs scale , which makes it Enough hard For various applications , including as a gemstone .

Formation crystal amethyst involves complex geological processes and requires condition certain . The required temperature range between 250°C to 400 °C, and stable pressure in system hydrothermal or environment pegmatite . According to Deer, Howie, and Zussman (2013), the deposition of quartz minerals can happen in form crystal big in the cavities rocks , and if there is element iron in solution hydrothermal , as well as followed by the irradiation process experience from environment around it , then crystals formed will own color purple that becomes characteristics typical amethyst .

Indonesia has potential high geology in matter the presence of precious and semi-precious stones , including amethyst . Some areas in Indonesia that were reported own content amethyst including Kalimantan, Sulawesi, and Papua. However, not yet Lots detailed research conducted to locations This . The information available at the Bandung Geological Museum provides description general about existence rock This as part from the country's mineral wealth , but Still required research more carry on For documenting quality and quantity in a way scientific . The Bandung Geological Museum was founded in 1928 and has collection more from 250 thousand specimen geology, including rocks , minerals, fossils , and artifacts geotechnical . Function the main of this museum is as means education public , research , and preservation inheritance Indonesian geology . According to the Ministry of Energy and Mineral Resources (ESDM), this museum become center information geology open national for society . Crystal stone amethyst exhibited in the museum became example real How collection geology can used as material learning and research in a way direct .

Observation result to crystal amethyst in the museum according to with literature geology that explains that color purple in amethyst happen consequence combination between iron and irradiation natural . Form crystal prismatic , system trigonal crystals , as well as characteristic physique other like shine glass and Mohs hardness 7 were also found in the library data . With Thus , observation field strengthen information that has been delivered in theory mineralogy . Based on The results obtained are available opportunity big For continue study This with use analysis laboratory like spectroscopy or microscope electrons. Research the can give information more in about structure micro crystal amethyst , type mineral

inclusions contained therein , and variations color based on Fe levels . Research continuation is also possible directed For map in a way more accurate locations producer amethyst quality high in Indonesia.

In general overall , crystal stone analysis amethyst at the Bandung Geological Museum shows that the museum has vital role in distribution knowledge geology to public . The displayed collection No only interesting visually , but also richly information scientific that can developed more carry on through research . Observation results This confirm importance conservation mineral collections and the importance of museums as center education easy science accessible to the public .

5. Conclusions

Based on the results of the research and observations conducted, it can be concluded that the amethyst crystal stone exhibited at the Bandung Geological Museum is one real example of Indonesia's geological wealth that needs to be studied and preserved. Amethyst is a variation of quartz with purple color characteristics caused by iron elements and natural irradiation. The observed specimens have good crystal shape, even color, and quite large size, indicating high quality and a stable formation process in a hydrothermal environment.

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