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ANALYSIS OF WASTE SAND AT DIAMONDS MINING CEMPAKA BANJARBARU

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Abstract

We had analyzed the content of waste in sand on around the diamond mining in Cempaka Banjarbaru South Kalimantan. The method that was used with atomic absorption spectroscopy (AAS). AAS is a spectroanalytical procedure for the quantitative determination of chemical elements using the absorption of optical radiation by free atoms in the gaseous state. The result showed that metal in the sand as material research is silica (Si) of (41.4345 ± 0.5581)% and Iron (Fe) of (2.7769 ± 0.0371)%. This results information of Cempaka's sand analysis are expected to be used as basis for optimal utilization of sand.

Keywords: cempaka sand, *atomic absorption spectroscopy (AAS).*

I. Introduction

Sands are mineral that have often found in many regions at Indonesia. Locations are used as sands mining locations are coastal and river. Different mining locations also produces different types of sands. The different types of sands because the contents of sands are different.

Actual Analysis about matters of the sands can be used as a reference, so it can be used effectively. All this time, sands of mining produces in Indonesia mostly only be used as compound of building materials. The economic values of sands will increase if it is known that the ingredient,so can be used optimally.

Some types of sand that have higher economic values than ordinary building materials sand is silica sand and iron. In accordance with its name, then it contents high silica and iron.

Silica sand SiO2 (Silikondioksida), usually found with other metal oxides. The higher levels of purity, the white color as well, and otherwise if SiO2 diminishing levels of purity, the sand will be reddish or brownish. Silica sand would be easy to agglomerate if it contains high water content [1]. Iron sand has a chemical formula Fe2O3 (FerriOksida) which are generally always mixed with SiO2 and TiO2 as it's impurities. Fe2O3 serves as a conductor of heat in the process of slag cement production [1]

As diamonds mining regions, Cempaka Banjarbaru has produced many rocks of high economic value. The rocks are generally treated as jewelry. However, sands mining waste such as regular sands, only used as building material compound. So that for sands mining waste have a high economic value, need to be done a research to analyze the content of sands waste. This study purposes to analyze the content of the sand waste at Cempaka diamond mine areas in Banjarbaru, South Kalimantan.

II. Method

The sample used in this study is solids of sand mining waste in the Cempaka diamond mining at Banjarbaru, South Kalimantan. This study using atomic absorption spectroscopy

(AAS) which is focused on analyzing the content of silica and iron.

AAS is a spectroanalytical procedure for the quantitative determination of chemical elements using the absorption of optical radiation by free atoms in the gaseous state [2]. The sample becomes atomized by injecting a solution into a flame (flame AAS) or by heating a dried sample in an energized graphite pipe (graphite tube AAS). As source of light, a hollow-cathode lamp (HCL) is used to determine the contained element. These element's atoms in the flame absorb precisely the wavelength sent by the source of light. The absorption is proportional to the concentration. The light produced by the HCL is spectrally divided in the monochromator, and only the resonance line is passed trough the exit slit [3].

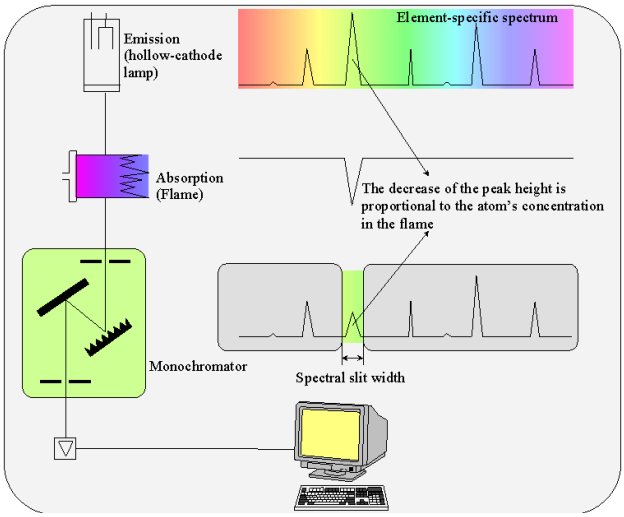

Figure 1. AAS [2].

The average measurements results are obtained using this equation [4] :

$$\bar{x} = \frac{\sum_{i=1}^{n} x_i}{N} \qquad (1)$$

Error of measurement:

$$\Delta\bar{x} = \sqrt{\frac{\sum_{i=1}^{n}(x_i - \bar{x})^2}{(N-1)}} \qquad (2)$$

III. Result and Discussion

Sample analysis performed in analytical chemistry laboratory at the Faculty of Mathematics and Natural Sciences, Universitas Gadjah Mada. The measurement results of samples for metals and iron levels can be seen in Table 1.

Tabel 1. The measurement results of samples

No.	Parameter	The measurement results (%)			Method
		I	II	III	
1.	Si	40,8764	41,9926	41,4345	AAS
2.	Fe	2,7769	2,7399	2,8140	

Metal content contained on the sands had been studied was Silica (Si) with (41,4345 ± 0,5581) % and Iron (Fe) with (2,7769 ± 0,0371) %. These results indicate that the waste sand of diamond mining in distric of Cempaka Banjarbaru mostly classified as silica sand. This is visible from the sand color looks yellowish white.

Based on the analysis, that sands waste of the area Cempaka diamond mining can be used as common benefits of silica sand as one of medium water filtration . Silica sands also can be used as raw material for glass maker, sandblasting process (scaling techniques / rust on a machine with high pressure silica sands spraying). Moreover, it can be used as raw material for the manufacture of metal roof because it can reduce sounds. Silica sand is also used as a mixture of cement, and as ceramic raw materials [5].

IV. Conclusion

The largest content in waste sands of diamond mining at Cempaka is the element silica. This Information analysis results about Cempaka sand content are expected to be used optimally. Cooperation with some agencies or personnal is needed so that the waste sand can be processed optimally, then it can increase its economic value.

V. Bibliography

[1] Marbun, Doni. 2012. Available at http://doni-marbun.blogspot.com/2012/10/ manfaat-pasr-silika-lengkap.html

[2] Anonymous. AAS. 2014. Available at www. tu-cottbus.de

[3] R. García and A. P. Báez (2012). Atomic Absorption Spectrometry (AAS). Available at http://www.intechopen.com/books/atomic-absorption-spectroscopy/ atomic-absorption-spectrometry-aas

[4] Bevington, Philip R. (1969). Data Reduction and Error Analysis for the Physical Sciences. New York: McGraw Hill

[5] Saputro, Adi. 2013. Available at http://teknologi.kompasiana.com/terapan/2013/02/11/-kegunaan-manfaat-fungsi-pasir-silika-selain-filter-air--533277.html