

Characteristics Of Two Ores Of Mineral Resources From Ikwo, Ebonyi -State

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ABSTRACT

Minerals are natural gifts to community when found, harnessed and utilized by man. Ores from “Ikwo” Local Government Area of Ebonyi State were analyzed. The result showed that Sample A contained : Pb^{2+} ($1.06g/dm^3$), Fe^{2+} ($5.56g/dm^3$), Zn^{2+} ($9.16g/dm^3$), and SO_4^{2-} ($3.84g/dm^3$). Sample B contained Co^{3+} ($32.39g/dm^3$), Ni^{2+} ($14.67g/dm^3$), Al^{3+} ($0.81g/dm^3$) and Na^+ ($91.54g/dm^3$). The density of both samples showed that A and B have $10.00gcm^{-3}$ and $7.20gcm^{-3}$ respectively with hardness of 5.78mohr for Sample A and 2.92 Mohr for Sample B. there is an indication that Sample A is hard hardness and B is soft hardness. Both ores are of economic importance to metallurgical and battery industries to achieve sustainable development and economic efficiency.

KEYWORDS: Mineral, Ore, Concentration, Hardness

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I. INTRODUCTION

Metallic and non metallic minerals by-products, aggregates and rock types that are used to make products we live in our daily life ^[1]. Mineral is a naturally occurring solid chemical substance that is formed through geological processes and has a characteristic chemical composition, highly ordered atomic structure and specific physical properties ^[2]. Ore is seen as the rocks from which minerals are mined for economic purposes. If two or more minerals have the same chemical compositions, but differ only in crystal structure, it is known as polymorph minerals. Geological studies of Ebonyi State show that the cretaceous succession in that area comprise a fairly uniform succession of shale with occasional thin bans of limestone and gritty sandstones. Solid masses of ore and gangue without any trace of shale are also found. Quartz is an abundant mineral in some of the lodes and forms persistent veins which are aligned parallel to the main ^[3,4].

II. EXPERIMENTAL

Sample collection: the sample ores A and B were collected from “Ikwo” in Ebonyi State and ground into powdery from under a standardized condition.

Methods

- ❖ Solvent extractionj
- ❖ Filtration
- ❖ Quantitative analysis
- ❖ Turbidimetric
- ❖ Photometric analysis

Results

Table 1: Quantitative analysis of Sample A and B

Elements	Sample A	Sample B	Mass Conc. (Mg/Kg)
Lead	Pb^{2+}	–	1.06
Cobalt	–	Co^{3+}	32.39
Nickel	–	Ni^{2+}	14.67
Iron	Fe^{2+}	–	5.56
Zinc	Zn^{2+}	–	9.16
Sulphate	SO_4^{2-}	–	3.84
Aluminium	–	Al^{3+}	0.81
Sodium	–	Na^+	91.51

Table II: Showing properties of the Ore

Properties of the Ore	Sample A	Sample B
Hardness (mohr)	5.87	2.92
Tenacity	Sectile	Poritile
Density(gcm-3)	10.00	7.20
Absorbance	430-510	400-590

III. DISCUSSION

Table I showed the quantitative result of these ions in mg/kg; Pb^{2+} (1.06mg/kg); Fe^{2+} (5.56mg/kg), Zn^{2+} 9.16mg/kg); and SO_4^{2-} (3.84mg/kg) in Sample A. It revealed that Sample A and B can be regarded as Pyrites (Lead-Zinc ores) which may have been as a result of metamorphosis due to temperature change. Sample A contents showed that it is orthoclase ore with the negligible mass concentration of Aluminium. The result of Ore characteristic analysis as shown in Table II is an evidence that shows that Sample A is quite different from Sample B. Sample A posses a hardness of 5.87 morhs while Sample B shows 2.92morh. This is ad indication that Sample A is a hard hardness as Sample B is a soft hardness with a density of $10.00gcm^{-3}$ and $7.20gcm^{-3}$ respectively. In terms of tenacity, Sample B is sectile (non powdered form), while Sample B is brittle and their absorbance ranges from 430-510nm for Samples A and B respectively.

IV. CONCLUSION

The constituents of these important elements in those Ores are indication that metallurgical industries can be cited in the Ikwo area of Ebonyi State to help harness these beneficial minerals. This will go a long way to improve both the state and nation's standard of living and even alleviate unemployment. Mineral deposits are gifts from God and are natural heritage with global importance. The Government is advised to site metallurgical industries at that place to harness these ores. This will provide employment opportunities to the citizens of the State.

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