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**THE INFLUENT OF INTENSITY AND TYPE OF ALTERATION TO THE
SECONDARY POROSITY OF THE PRE-TERTIARY BASEMENT ROCK OF
SOUTH SUMATRA BASIN**

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ABSTRACT

Study area located at the Jambi Sub Basin, South Sumatra. The area is bounded by the *Tigapuluh Mountain* in the north, the *Barisan Mountain Ranges* in the west, the basement high partially shown as the *Duabelas mountain* in the south, and, the basement high partially shown as *Belitung, Bangka, Singkep and Lingga Islands* in the east.

The samples are obtained from pre-Tertiary igneous rock at JSB-3, JSB-4 and JSB-6 wells that represent a part of pre-Tertiary basement rock from Jambi sub Basin, South Sumatra. Lithology of the pre-Tertiary basement at the Jambi Sub Basin is dominated by andesite in JSB-3, granite in JSB-4 and granodiorite in JSB-6. Weakly – strongly hydrothermal alteration occurred in all samples. Petrography study indicates that alteration mostly through replacement process of primary minerals followed by filling of secondary minerals through pore and fracture. The type of alteration is classified as outer/sub propylitic – phyllic, which can be divided into two alteration minerals assemblages; the chlorite – illite – calcite group in the first episode; and the sericite ± quartz group in the second episode.

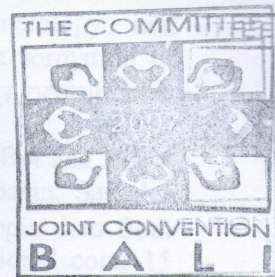
Secondary porosity is resulted from the dissolution process in the rock forming minerals especially secondary minerals; and in the empty fracture or partially associated with the filled fracture. The type of alteration has influent to the secondary porosity of the dissolution process. The increasing of alteration intensity which is replaced primary minerals, also caused the increasing of secondary porosity

Key words: Basement, igneous rock, hydrothermal alteration, replacement, secondary mineral, dissolution

THE INFLUENT OF MINERAL DISSOLUTION PROCESS TO THE SECONDARY POROSITY OF THE PRE-TERTIARY BASEMENT ROCK OF SOUTH SUMATRA BASIN

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ABSTRACT

The objective of the research is to identify the dissolution process of the mineral composed of the pre-Tertiary basement rock from South Sumatra Basin petrographically and its relationship with the formation of secondary porosity. The pre-Tertiary basement rock of South Sumatra Basin is represented by sample from JSB-3, JSB-4 and JSB-6 wells. The rocks are andesite in JSB-3, granite in JSB-4 and granodiorite in JSB-6. Hydrothermal alteration occurred in JSB-3, JSB-4 and JSB-6 has weakly - strongly intensity. Microscopically, the alterations are mostly through replacement process of primary minerals and followed by pore and fracture filling by secondary minerals. The type of alteration is classified as outer/sub propylitic - phyllic.

Thin sections shown dissolution process occurred in the margin of plagioclase and some are placed in the weakly zonal of plagioclase that associated with alteration minerals of sericite and fine muscovite as well as calcite which is partially dolomitized. Dissolution in muscovite partially associated with dolomitized calcite, otherwise K-feldspar dissolution associated with perthite texture. Secondary porosity resulted from dissolution primary mineral alteration, mostly found in plagioclase as pin points and spongy pore system related with replacement by alteration minerals of calcite and sericite; perthite texture in K-feldspar which is dissolved partially; and dissolution of alteration mineral from muscovite and biotite.

The research concludes that the secondary porosity is resulted from mineral dissolution process in primary and secondary minerals, and also resulted from fracture porosity of empty fracture.

Keywords: Basement, igneous rock, hydrothermal alteration, replacement, secondary mineral, dissolution

INTRODUCTION

Geographically, South Sumatra Basin is located in southeastern part of Sumatra Island. The Basin is bounded by the Tigapuluh Mountain in the north, the Barisan Mountain Ranges in the west, the basement high part of the Duabelas mountain in the south, and the basement high part of Belitung, Bangka, Singkep and Lingga Islands in the east. The Research area is located at the pre-Tertiary Basement High structurally defined as anticline with northeast - southwest trend. Figure 1 shows research area in the regional tectonic setting of Sumatra.

Seven lithostratigraphic units overlying the pre-Tertiary Basement complex of Mesozoic igneous rocks and Paleozoic metamorphics and carbonates, in the ascending order are :

- Lahat Formation
- Talang Akar Formation
- Baturaja Formation
- Gumai Formation
- Air Benakat Formation
- Muara Enim Formation

The structural features are the result of orogenic activity that occurred in at least three separate episode, these are :

1. The Mid-Mesozoic orogeny, took place when the Paleozoic and Mesozoic strata were metamorphosed, faulted, and folded into large structural blocks or belts and intruded by granite batholiths.
2. The Late Cretaceous - Early Tertiary tectonism, occurred probably in Late Cretaceous and Early Tertiary time, when major tensional structures that include grabens and fault blocks were formed in the basins of sumatra.
3. The Plio - Pleistocene orogeny, are the most prominent structural features in the basin with northwest trending folds and faults.