

Geochemical Study of Claystone from Nunukan Island, North Kalimantan of Indonesia

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Abstract : Nunukan Island is located on North Kalimantan of Indonesia. The region is one of Indonesia's cross-border with Malaysia. In conjunction with its strategic geographic location, its potential as the new oil and gas resources has brought many researchers to do their studies here. The research area consists of claystone which criss-crossed with quartz sandstone. There are also rocks claystone-grained which are the weathering product of basaltic volcanic rocks. In some places, there are argillic clays which are the hydrothermal-altered product of Sei Apok ancient volcano. Geochemical study was established to learn the origin of the claystones, whether it came from weathering, hydrothermal alteration, or both. The samples used in this research are fresh rock, weathering rocks, hydrothermally-altered rock, and claystones. Chemical compositions of each sample were determined and their relations was studied. The studies encompass major and minor elements analysis using X-Ray Fluorescence (XRF) method and trace elements analysis, specifically rare earth elements, using Inductively Coupled Plasma-Mass Spectrometry (ICP-MS) method. The results were plotted on certain graphics to learn about the trend and the relations of each sample and element. Any changes in chemical compositions, like increase and decrease of elements or species, was analysed to learn about geological phenomenon that happens during the formation of claystones. The result of this study shows that claystones of Nunukan Island have relation with volcanic rocks of its surrounding area. Its chemical composition profile corresponds to weathering product of volcanic rocks rather than hydrothermally-altered product. The general profile also resembles claystone minerals of illite or montmorillonite, especially in the existence of aluminum, iron, potassium, and magnesium. Both minerals are formed in basic condition and commonly happen to shales. It is consistent with the fact that claystone was found mixing with shales and silt to clay grained mudstones in field exploration. Even though the general profile is much alike, the amount of each elements is not precisely the same as theoretically claystone mineral compositions because the mineral have not formed completely yet.

Keywords : claystone, geochemistry, ICP-MS, XRF

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