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The Lithogeochemical Characteristics and Tectonic Setting Research of Sulit Skarn-Type Copper Deposit in Sumatra Island, Indonesia

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As the significant area for the mineral deposits, SumatraIsland owns the numerousmineral commodity (precious metal as gold and silver, base metal as copper, lead,zinc,tin, etc), and various deposit types(e.g., skarn type copper deposit, epithermal type lead-zinc deposit) (Crow and VanLeeuwen, 2005). There are also the experiences of multi-period and phase tectonic - magmatic activities and different era volcanic-intrusive rocks with poly-natures spreading the whole island (VanLeeuwen, 1994). Therefore, on the basis of the lithogeochemical research, concluding the tectonic attribution for the rock related to the mineralization, has the significance for not only deepening the theoretical research of petrogenesismineralization, but also the prospectingespecially the same type deposit. This article provided the petrological and lithogeochemical contrast research between the diorite porphyry in the Sulit skarn-type copper deposit and adjacentdistrict in the central part of SumatraIsland, explored the tectonic setting of rock-forming and mineralization in the combination with previous data.

1 The Lithological Characteristics of Diorite Porphyry and Skarn

The phenocryst of diorite porphyry mainly consists of plagioclase, quartz, biotite and hornblende. The chloritization, epidotization and rare potassium feldspathization can be recognized within the biotite phenocryst. The groundmass is mainly composed of the sodium feldspar and quartz, trace of acicular and cylindrical epidotization hornblende, rare potassium feldspar.

2 The Geochemical Characteristics and Tectonic Attribution of Diorite Porphyry

Low content of SiO₂(42.68%), high content of Fe₂O₃

(17.41%), FeO and K_2O . The SiO₂content of diorite in Sulit is close to it of Indosinian Rao-Rao diorite in the adjacent district, but strikingly lower than the Muarasipongi diorite.

In the FAM diagram, the Sulit diorite dropped in the tholeiite series area, the Muarasipongi diorite dropped in the calc-alkaline series. In the FeOt-MgO-Al2O3 diagram, the Sulit diorite dropped in the continentalflood basalts area, both diorites from Muarasipongi and Rao-Rao dropped in thearc volcanic rocks area.As a whole, the REE model of Sulit diorite is characterized by smoothly right-incline, a higher ΣREE (70.76×10⁻⁶), light REE enrichment and low positive Eu anomaly($\delta Eu=1.128$), which is similar to the model of mesobasic- ultrabasic rocks in the continental margin rift basin. In summary, different from neither Muarasipongi nor Rao-Rao diorites which formed in the volcanic arc setting from the collision margin of continental, the Sulit diorite has similar lithogeochemical characteristics to continental flood magma in the rift of continental margin, probably related to the crust extensional setting after the collision.

3 Petrogenesis-Mineralization and Dynamic Settings of Sulit Copper Deposit

By the ${}^{40}\text{Ar}/{}^{39}\text{Ar}$ dating, Imtihanah(2000) acquired 192±0.4Ma and 193±4Ma as the emplacement age of Sulit pluton, that is consistent with 200-180Ma determined by Van Bemmelen(1949), as the age of the intrusion outside around Sulit. On the basis of chronological evidence, in combination with lithogeochemical study, it is proposed as follows: Sulit copper deposit is the product during early Jurassic, might be related to the intrusion of magma from the extensional settings after the late Indosinian period.

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