1 Introduction

Kalimantan island is located in the southeastern margin of Euroasia plate, belonging to the western Pacific tectonic-magmatic belt, and it is the largest island in southeast Asia. The Kalimantan island is adjacent to the South China Sea marginal oceanic basin in the north, to the Philippine Mobile Belt and the Philippine Sea Plate in the east, to the Banda and Sunda arc systems in the south, and to the Sunda shelf and Paleozoic and Mesozoic continental crust of the Malay Peninsula in the west (Fig. 1). Kalimantan island is one of the most complex lithospheric tectonic areas on earth from the Mesozoic-Cenozoic (Zaw et al., 2011). The Lamandau region is located in the southwestern of Kalimantan island, and the main outcropping intrusion is diorite porphyry, which is also the host rock for an IOCG deposit.

2 Results and Discussion

In this study we report the major and trace element compositions, U-Pb dating results of the Lamandau diorite porphyry. The collected samples of the Lamandau diorite porphyry are with SiO\textsubscript{2} ranging from 55.72% to 57.07%, K\textsubscript{2}O ranging from 1.72% to 1.81%, K\textsubscript{2}O/Na\textsubscript{2}O ranging from 0.44 to 0.46, and total alkali contents ranging from 5.55% to 5.80%. The diorite porphyry belongs to a calc-alkaline series. The diorite porphyry has high Al\textsubscript{2}O\textsubscript{3} contents, ranging from 17.68% to 18.32%. And the Fe\textsubscript{2}O\textsubscript{3} and MgO contents in the diorite porphyry range from 7.96% to 8.95%, from 2.20% to 2.73%, with Mg\# from 0.33 to 0.39.

The diorite porphyry show high Ba and Sr contents, ranging from 354 to 405 ppm, from 485 to 553 ppm, respectively; and relatively low Rb contents, ranging from 43 to 51 ppm. The Sr/Y and Nb/Ta ratios range from 21.03 to 25.07 and from 13.5 to 14.25, respectively. The primitive mantle normalized spider diagram is shown in Fig. 2a. The diorite porphyry was characterized by enriched large ion lithophile elements (Rb, Ba, Sr) and light rare earth elements (LREEs), depleted high field strength elements (Nb, Ta, P, Zr, Ti) and heavy rare earth elements (HREEs).

The diorite porphyry has low rare earth elements contents, with the \( \Sigma \)REE values ranging from 122.2 to 150.0 ppm. The chondrite-normalized REE patterns of the Lamandau diorite porphyry (Fig. 2b) exhibit a high degree of fractionation between LREEs and HREEs, and ratios of \( \Sigma $$L$$REE/ \Sigma $$H$$REE, L\textsubscript{Eu}/Y\textsubscript{b} \) are ranging from 6.77 to 7.69, from 6.79 to 8.34, respectively. These of trace elements

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characteristics in Lamandau diorite porphyry is similar with arc igneous rocks (Defant and Kepezhinskas, 2001).

Zircons from Lamandau diorite porphyry (11KLLA1-1) are small in size, with particle size in 30~100 μm. These zircons are transparent, and mostly euhedral in morphology. A selection of 21 zircons of sample 11KLLA1-1 have high Th and U contents, ranging from 186.4 to 4453.7 ppm, from 206.3 to 1675.7 ppm, respectively. The Th/U ratios of these zircons range from 0.63 to 3.62, confirming their magmatic genesis further. These magmatic zircons of sample 11KLLA1-1 form a tight cluster on Concordia and yield a weighted mean 206Pb/238U age of 78.7 ± 2.3 Ma (n=21, MSWD=14, 95% confidence level) (Fig. 3).

The large-scale Yanshannian magmatic activities mainly occurred south to equator in West Kalimantan Island, and formed tonalite and granodiorite intrusion. In the southwest part of Kalimantan Island, the late Cretaceous granite are associated with basic-intermediate volcanic rocks (formed during late Cretaceous to early Paleocene) (Hutchison, 1989; Zhou et al., 2005). The three zircon dating results are consistent with each other, showing the diorite porphyry in Lamandau region formed at the age of 78.7±2.3 Ma, which is interpreted as the formation time of the Lamandau diorite porphyry at the Late Cretaceous during Yanshannian. During the last two decades, geologists found a series of Cenozoic epithermal gold deposit in Kuching High, and preliminary researched the geodynamics (Hutchison, 1996; Soeria-Atmadja et al., 1999; Van Leeuwen, 1994). The Lamandau deposit is located south to the Kuching High on Sandaland. Thus we infer this deposit may also form in the Cenozoic, related with the Pacific plate subduction during Late Cretaceous to Paleogene.

We conclude that the Lamandau IOCG deposit was formed in the Cenozoic, and the host diorite porphyry was formed in the Late Cretaceous, which is related with the Pacific plate subduction during Late Cretaceous to Paleogene.

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