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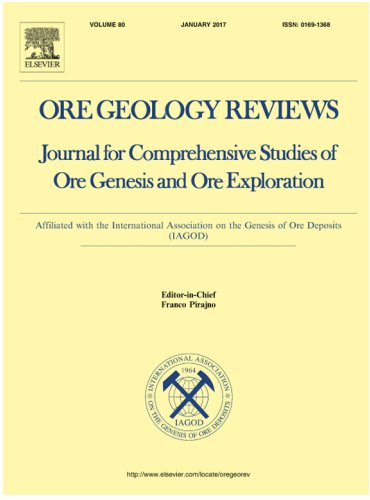

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Liqing Nie, Taofa Zhou, Yu Fan, Lejun Zhang, David Cooke, Noel White

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Geology, Geochemistry and Genesis of the Makou Magnetite-Apatite Deposit in the Luzong Volcanic Basin, Middle-Lower Yangtze River Valley Metallogenic Belt, Eastern China

Liqing Nie[a,b], Taofa Zhou[a,b]*, Yu Fan[a,b], Lejun Zhang[c], David Cooke[c], Noel White[a,b]

a School of Resources and Environmental Engineering, Hefei University of Technology, Hefei 230009, China

b Ore Deposit and Exploration Centre (ODEC), Hefei University of Technology, Hefei 230009, China

c Centre of Excellence in Ore Deposits (CODES), University of Tasmania, Private Bag 79, Hobart, Australia

* Corresponding author. E-mail address: tfzhou@hfut.edu.cn (Taofa Zhou).

Abstract

The Middle-Lower Yangtze River Valley Metallogenic Belt (MLYB) is located on the northern margin of the Yangtze Plate (eastern China). Ore deposits in the belt are mainly clustered in seven ore districts, and are closely associated with Mesozoic intermediate-felsic magmatic rock. Among the seven ore districts, the Luzong and Ningwu districts host large-scale iron resources in volcanic basins. The Makou magnetite-apatite deposit in the southern Luzong Basin was previously interpreted to be related to a quartz syenite porphyry. In this study, we conducted field geological studies and determined the age and geochemistry of the Makou intrusive rocks. Petrography and electron probe micro analysis (EPMA) indicated that the Makou ore-hosting rocks have intense albite alteration. The wallrock alteration is spatially restricted, and comprises albite alteration (Stage I), magnetite mineralization (Stage II), quartz-sulfide alteration (Stage III) and carbonate alteration (Stage IV) stages. Fluid inclusions in syn-mineralization apatite homogenized at 252.2 - 322.6 °C, which slightly lower than is typical for magnetite-apatite deposits in the region. Field study revealed that the quartz syenite porphyry at Makou disrupted the orebodies along clear-cut intrusive contacts, and that the quartz syenite porphyry does not contain iron mineralization, suggesting it has no direct genetic relationship with the iron mineralization. The ore-hosting albitite and ore-forming biotite diorite have LA-ICP-MS zircon U-Pb ages of 129.6 ± 1.2 Ma