Geochemical Characteristics of Two Stages of Basic Dykes and Gold Mineralization at Funing, Yunnan Province, China

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Abstract: The relationship between basic rocks and gold deposits has always been paid much attention. In this paper, two basic dykes and several large gold deposits in the Funing area have been studied. The results show that, the U-Pb age of 258±5 Ma for the early basic rock is consistent with those of previous studies which had shown that the early basic rock in the Funing area was associated with the Emeishan mantle plume. The $^{206}Pb/^{238}U$ age of 219.9±6.6 Ma (MSWD=1.2) for the late basic rock suggest that it is significantly different from the early basic rock. The study on the major, trace, and rare earth elements of the late basic rock shows that there could be subduction material contamination for the magma which was a mixture of melts derived from the partial melting of the enriched lithospheric mantle (E-MORB) and the depleted lithospheric mantle (N-MORB). Combined with previous researches on the tectonic activity in the region, it was concluded that the late basic rock was derived from the mantle and contaminated by subduction materials. A comprehensive study of mineralography and geochemistry shows that the basic rocks of two stages had contribution to the formation of gold deposits. The early basic rock played a limited role for the gold mineralization. Due to the age of the late basic rock is roughly coincided with the metallogenic ages of several large gold deposits in the region, with the combination of the geochemical analyses and previous studies, it is believed that the late basic rock has provided not only ore-forming materials mainly extracted from strata, but also an important heat source for the metallogenic fluid circulation and mineralization. Together with superposed mineralization of frequent tectonic activities on early deposits, several large gold deposits were finally formed in this area. Therefore, we think that the late basic rock could be closely related to the gold mineralization in this region, and it is an important sign for further exploring various sized gold deposits in the area.

Keywords: basic rock; zircon U-Pb dating; geochemical characteristics; rock genesis; gold deposit