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Geochemical characteristics of trace elements and their implications for the Xingyuanchong Cu polymetallic deposit, northwest of Jiangxi province, Qingzhou-Hangzhou metallogenic belt (QHMB), China

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The Qinzhou Bay (Q)-Hangzhou Bay (H) orogenic juncture belt is a giant suture separating the Yangzi block from the Cathaysian block in Southern China. It can be divided into three segments: the Northern; the Middle; and the Southern Segment. This division is based on their geological variations but coincides broadly with the 24° and 27° north latitude. The Middle Segment is in accordance with the traditional Nailing belt, the Northern Segment is roughly coincident with the Shaoxing - Jiangshan - Pingxiang zone, while the Southern Segment is consistent with the Yunkai - Shiwandashan Mountainous zone.

The Xingyuanchong polymetallic deposit is one of the significant discoveries in Qingzhou-Hangzhou metallogenic belt (QHMB), northwestern Jiangxi Province. In recent years, however, studies of the deposit have been limited and its genesis is still unclear. The deposit consists of the Yemaochong, Fengshuao and Liujiachong ore zones. The ore body is located in the middle layer of the Yifeng Formation. The ore commonly occupies veins and bedded veins. The main metallic minerals include pyrite, chalcopyrite, sphalerite, galena and cubanite. Samples from the Fengshuao ore-section, which has sedimentary host rocks, were selected to analyze the trace elements using ICP-MS and EPMA. The results show that from ores to mineralized wall rocks to distal surrounding rocks, the contents of Co and Ni gradually decrease and other trace elements such as Sr, Rb and Ba gradually increase. Surrounding rock and ore mineralization are significantly enriched with Co (13.56 ppm ~ 279.1 ppm), Ni (40.95 ppm ~ 116.1 ppm). Depletion in Sr, Rb, Ba and the majority of other trace elements is also observed. The content of ΣREE in wall rocks is higher than in ore and mineralized surrounding rocks. δEu tends slightly elevated. Ores and surrounding rocks have similar REE distribution patterns. The ratio of Co/Ni gradually increases, with values greater than 1 in ore and mineralized rocks. The ratio of Co/Ni of chalcopyrite ranges from 3.05 to 29 with an average 11.43. The geochemical behavior of these elements is consistent with a sedimentary exhalative process. Co/Ni also falls into the typical sedimentary exhalative range. In addition, plots of Th/Yb -Ta/Yb and Sr/Y ratios suggest that the tectonic environment of the deposit is related to a continental marginal arc, which is consistent with the Pingshui Cu-Pb-Zn polymetallic deposit.