Hydrothermal activity history of Duanqiao hydrothermal field, the Southwest Indian Ridge: evidence from $^{230}Th/^{238}U$ geochronology of polymetallic sulfides

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Duanqiao hydrothermal field is one of the most typical hydrothermal field in the Southwest Indian Ridge. The thickness of its oceanic crust is relatively thick (~9.5 km), and magma supply is relatively large, which provides sufficient heat sources for the formation of polymetallic sulfides. It is one of hotspots in recent years. Metallogenic chronology is an important component of the middle ocean ridge polymetallic sulfide mineralization, which is the contrast and foundation for the study of the deposit. Based on the seafloor polymetallic sulfides including one sulfide core, massive sulfides and chimneys from Duanqiao hydrothermal filed, the Southwest Indian Ridge, this study intends to carry out the $^{230}Th/^{238}U$ dating research, in order to reconstruct the formation history, accumulation history and hydrothermal activity history and preliminary evaluation of potential resource of polymetallic sulfides of Duanqiao hydrothermal filed, the southwest Indian Ridge. Part of the data suggests that four main episodes of hydrothermal activity of Duanqiao were determined according to the restricted results: 68.9–84.3, 43.9–48.4, 25.3–34.8, and 0.7–17.3 kyrs. Hydrothermal activity of Duanqiao probably started about 84.3 (±0.5) kyrs ago and ceased about 0.737 (±0.023) kyrs ago. By comparing sulfide ages of the dragon flag, Mt. Jourdanne hydrothermal field of super slow southwest Indian ridge, the slow spreading ridges, medium spreading ridges and fast spreading ridges, the hydrothermal activity history throughout the midocean ridges will be understood.

Keywords: Southwest Indian Ridge (SWIR), Polymetallic sulfides , $^{230}Th/^{238}U$ geochronology, Hydrothermal activity