

The Re–Os Dating of Bitumen from Paleo–Oil Reservoir in the Qinglong Antimony Deposit Area, Southwestern Guizhou, China and Its Geological Significance

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Abundant organic inclusions are present in the Qinglong antimony deposit. However, the source rocks of these organic matters have not been reliably identified. In 2012, a paleo–oil reservoir was found in the Qinglong antimony deposit. In view of similar components of gaseous hydrocarbon, we propose that the organic matters observed in inclusions in Qinglong antimony deposit would come from this paleo–oil reservoir.

We used the Re–Os dating method to determine the age of the bitumen from this paleo–oil reservoir, and obtained an isochron age of 254.3 ± 2.8 Ma. The age indicates that the oil generation from source rock occurred in the early Late Permian, earlier than the Sb mineralization age ($\sim 148 \pm 8.5$ Ma) in the Qinglong antimony deposit area. After oil generation from Devonian source rock, first and secondary migration, the crude oil have probably entered into the fractures and pores of volcanic rocks and limestone and formed a paleo–oil reservoir in the western wing of Dachang anticline.

As burial process deepened, the crude oil has turned into natural gas, migrates into the core of Dachang anticline and formed a paleo–gas reservoir. The hydrocarbons (including CH₄) in the reservoirs can serve as reducing agent to provide the sulfur required for Sb mineralization through thermal chemical reduction of sulfates. Therefore, the formation of oil–gas in the area is a prerequisite for the Sb mineralization in the Qinglong antimony deposit.