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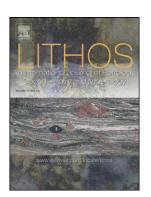
Ting Gan, Zhilong Huang

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ACCEPTED MANUSCRIPT

Platinum-group element and Re-Os geochemistry of lamprophyres in

the Zhenyuan gold deposit, Yunnan Province, China: implications for

petrogenesis and mantle evolution

Ting Gan^{1,2}, Zhilong Huang^{1,*}

1. State Key Laboratory of Ore Deposit Geochemistry, Institute of Geochemistry,

Chinese Academy of Sciences, Guiyang 550081, China

2. University of Chinese Academy of Sciences, Beijing 100049, China

*Corresponding author. Tel./fax: +86 0851 85891664

E-mail address: huangzhilong@vip.gyig.ac.cn

Abstract

Cenozoic lamprophyres are widespread along the Ailaoshan suture, SW Yunnan,

SW China, where there are also many important gold deposits, especially the

Zhenyuan deposit. We have carried out a geochemical investigation of the Zhenyuan

lamprophyres in terms of major and trace elements, platinum-group elements (PGE),

and Os isotopes. The Zhenyuan lamprophyres can be classified into groups with high

or low Os concentrations. The ¹⁸⁷Os/¹⁸⁸Os ratios, corrected for *in situ* growth, are

highly variable in both types of lamprophyre, ranging from mantle values up to 1.13.

The highly radiogenic Os isotopic signatures are interpreted as being due to long-term

accumulation of elevated Re/Os in the lithospheric mantle, as a result of

subduction-related metasomatism. The highly variable ¹⁸⁷Os/¹⁸⁸Os ratios of the

low-Os lamprophyres might also have resulted from metasomatism of a deeply

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