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Petrogenic Indicator of Zedang Mantle Peridotite, Tibet: Insights from the Unusual Minerals

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1 Introduction

Recent studies show that a large number of unusual minerals are hosted mainly by chromites in the mantle sections of ophiolites (Bai et al., 2000; Yang et al., 2007; Yang et al., 2015). These minerals include native elements, oxides, carbides, PGE and base metal alloys, sulphides, silicates and have significant potential petrogenic and geodynamic significance.

2 Unusual Mineral Assemblage from Zedang Peridotite

We have collected 526kg of harzburgite rocks from the Zedang mantle peridotite for manual heavy mineral research, to further investigate the physical and chemical environment of these unusual minerals. Diamond, moissanite, zircon and more than 30 other mineral species have been discovered in the Zedang mantle peridotite, similar to other mantle peridotites in the Yarlung Zangbo ophiolite belt.

3 Petrogenic Significance of Zedang Peridotite

These unusual mineral species and continental crust-derived materials exist in mantle peridotite suggesting a genetic information relationship with mantle peridotite. Ancient crust may have experienced continental deep subduction or lithosphere delamination into the mantle, even into the mantle transition zone (410~660km), in an early stage of the process. Subsequently, these crustal

materials were modified under high pressure and super-reduced conditions within the deep mantle, and then upwelled to shallow levels as a result of mantle plume or mantle convection processes (Liou et al., 2014; Yang et al., 2015; Zhou et al., 2014). A large number of unusual mineral assemblages have been trapped within the mantle peridotite by such a recycling process. Comprehensive research on the mineralogy of unusual mineral assemblages in mantle peridotite is thus of great significance for understanding crust-mantle exchange and deep mantle dynamics.

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