

# **Mineralogy and Geochemistry of Early Cretaceous Lamprophyres in Shandong Peninsula: Implication for Lithospheric Evolution of the Eastern North China Craton**

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The Jiaodong Peninsula is the most important gold producing province in China. The Cretaceous lamprophyre dikes are abundant in this area and show close relationship with gold deposits temporally and spatially. The petrogenesis and magmatic source of these lamprophyres remain controversial. A detailed mineralogical and geochemical studies have been carried out on these lamprophyres in this paper. There are three populations of pyroxenes with different genesis in the lamprophyres whose dating is ~112Ma, coinciding with the mineralization age of Jiaodong gold deposits. The zoning pyroxenes indicate the existence of magma mixing. Barometric study of these pyroxene crystal populations suggest that they are formed in different depths including the boundary of asthenosphere and lithosphere mantle, the junction of the lower crust and mantle, and shallow crust. Combining with whole rock geochemical data, which are characterized by high MgO, Mg#, low TiO<sub>2</sub>, Al<sub>2</sub>O<sub>3</sub>, total Fe<sub>2</sub>O<sub>3</sub>, enriched in LILEs, LREE, depleted in HFSEs, and with high initial <sup>87</sup>Sr/<sup>86</sup>Sr, negative εNd(t), we suggest that lamprophyre magma was derived from partial melting of lithospheric mantle, which had been in multiple metasomatism and enrichment processes. The source of lamprophyre magma include the composition of asthenosphere, Yangtze plate, and subducted slab-derived carbonate fluid/melt.

\*This study is supported by the fund from the Ministry of Science and Technology of People's Republic of China (No. 2016YFC0600105) and the National Natural Science Foundation of China (4152098 and 41673058).