

## Nd-Sr-Pb Isotopic Geochemistry of Gabbroic Xenoliths from Hannuoba, China

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### Introduction

The Hannuoba basalt, which is located in the northern part of Hebei Province, is well known to be abundant ultramafic and mafic xenoliths. The Hannuoba basaltic field covers an area of about 1700 km<sup>2</sup>, constituting a basaltic plateau as part of the inner Mongolia Plateau. Reported in the paper are the Sr, Nd and Pb isotope data for ten gabbroic Xenoliths.

### Discussion of Result

With  $\epsilon_{Nd}(t)$  of  $-4.1 \sim -7.5$ ,  $(^{87}Sr/^{86}Sr)_i$  of  $0.704989 \sim 0.708496$ ,  $(^{206}Pb/^{204}Pb)_i$  of  $16.307 \sim 17.425$ ,  $(^{207}Pb/^{204}Pb)_i$  of  $15.224 \sim 15.507$  and  $(^{208}Pb/^{204}Pb)_i$  of  $37.198 \sim 37.910$ , all alkali basalts are concentrated in a small area, tholeiitic basalts are isotopically more diverse than alkali basalts and sit along the line of the bulk earth, and the Hannuoba xenoliths are almost scattered in the whole depleted field, whereas gabbros are located in an isotopically enriched field. This indicates that the sources of basalts are quite different.

### Conclusion

Based on the above information, it is proposed that the gabbroic xenoliths are these products of mantle magma activity in the early history. The produced basaltic partial melts, when uprising, would undergo different degrees of segregation and mixing and be preserved ultimately at the depth on the boundary between the lower crust and the upper mantle as underplating. They may be the cumulates and differentiates, and represent a series of samples ranging from liquids to residue genetically related to multiple mantle melting events. To sum up, the gabbroic xenoliths from Hannuoba are more mafic than basalts, obviously different in both incompatible and compatible trace element contents, low in radiogenic Pb and highly enriched in Nd and Sr isotopes. Their isotopic variations can be ascribed mainly to various multiple melting, subsequent segregation and long-term evolution, partly due to the difference in mineral proportion.

[1] Wang YX, Gu LX, Zhang ZZ, Wu CZ *et al* 2006. Geochronology and Nd-Sr-Pb isotopes of the bimodal volcanic rocks of the Bogda rift. *Acta Petrologica Sinica*, **22** (5): 1215-1224