

Heterogeneity of MORB composition along the eastern part of the Southwest Indian Ridge

NATSUKI NEO AND SUMIO MIYASHITA

Graduate School of Science & Technology, Niigata University, Niigata, 950-2181 Japan
(f05j007a@mail.cc.niigata-u.ac.jp; miyashit@geo.sc.niigata-u.ac.jp)

Regional variations of basalt compositions from the eastern part of the Southwest Indian Ridge (SWIR) were shown by Natland (1991), Meyzen *et al.* (2003) and Robinson *et al.* (1996). However, the definitions for the regional variation along the SWIR are different from each other in above studies. We have analyzed major and minor element compositions (including REE) of basalts obtained from 55E to 70E along the SWIR. In this study, We discuss for the regional variation based on our result and PETDB.

We defined from 55E to Rodriguez Triple Junction (RTJ) into 4 areas; Area I: 68E to RTJ (70E) , Area II: 60E to 68E , Area III: 57E to Melville F. Z. (60E) , Area IV: 55E to Atlantis II F. Z. (57E). The basaltic rocks from Areas I&IV, II and III show different trends, indicating that they were not derived by simple fractional crystallization, but also by a different degree of partial melting.

The basalts of Areas I & IV show a N-MORB-like REE pattern, while those of II show enriched pattern in LREE. The Area II basalts are also characterized by high Na₂O contents (3.5~4.5 wt%; Mg# 57~67) nevertheless with less-evolved composition. Area III basalts are intermediate~both in REE pattern and Na₂O contents.

We conclude that enriched source in terms of LREE and Na₂O exists under Area II. Whereas Area I & IV are underlain by N-MORB-like source. The intermediate composition in Area III may be explained by mixing between enrich source and N-MORB source. It is noted that the enriched source of Area II is completely distinct from E-MORB signature.

References

- Natland J. H. (1991) *Oceanic Basalts* (ed. Floyd P. A.) 288-310
Meyzen. M. C. *et al.*, (2003) *Nature*, **421**, 731-733
Robinson, C. J. *et al.*, (1996) *Geological Society Special Publication*, **118**, 131-141

Boron influence on biochemical reactions in natural zeolites

A. NEUBECK, M. IVARSSON AND N.G. HOLM

Department of Geology and Geochemistry, Stockholm University, 106 91 Stockholm, Sweden,
(anna.neubeck@geo.su.se, magnus.ivarsson@geo.su.se, nils.holm@geo.su.se)

The special zeolitic characteristics such as cation exchange, molecular sieve capacity, open crystal framework and reversible dehydration make them interesting in many aspects. They may be used as absorbents for pollutants in the agricultural and environmental industry, fertilizers and in the treatment of nuclear wastewaters. Another use is to investigate their role as catalysts or adsorbents of organic compounds in their crystal channels, which provide a protected microenvironment for chemical reactions. Adsorbance of labile biomolecules onto the zeolite crystal tunnel walls may stabilize and therefore trigger their readiness to further react, possibly in polymerization reactions.

It has also recently been shown that borate minerals stabilize ribose, a highly thermo-labile pentose, by forming complexes₁. Even synthesis of pentoses is possible in the presence of borate. Thus, boron containing minerals may have been important in the development of larger biomolecules on the early Earth.

In our project, we are going to do gaseous and aqueous adsorption tests on natural zeolites, with and without boron in their crystal structure. In some of our material, boron has substituted for beryllium and possibly silica in the zeolitic crystal framework. The combination of the microenvironment given from the zeolite and the stabilizing properties of boron may be ideal for some organic reactions. Until now, most adsorption tests have been made on synthetic zeolites for industrial usage. Natural zeolites will provide a better analogue to actual earthly systems than synthetic ones.

Reference

- Ricardo A., Carrigan M.A., Olcott A.N., Benner S.A., (2004), *Science* **303**, 196