

REE variation of Ultramafic rocks related to the Serpentinization, the Gyeonggi Massifs in the western Korea

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I. Introduction

High-pressure amphibolite-facies rocks with serpentinized ultramafic rocks occur in the Gyeonggi Massif. Ultramafic rocks occur as lenses within Precambrian granite gneiss, which showing dominantly tectonic lines of NNE directions as well as east extensional area of the Chinese collision belt between south and north China block(?). This study regionally makes a comparative study of ultramafic rocks in the western part of the Gyeonggi Massif in Korea. However, it considers the different character according to their locality (i. e., Bibong, Baekdong, Hongseong, Chungnam, Jugjeon, Kwangsi, Singok, Yugu, Kaewol and Singjin) in this view. The purpose of this study is for REE variation related to the degree of serpentinization of ultramafic rocks from the western part of the Gyeonggi Massif in Korea. The purpose of this study is to obtain exactly origin of the ultramafic rocks in the western part of the Gyeonggi Massif in Korea.

2. Methods

Ultramafic rocks are mainly dunites and harzburgites consisting of olivine, orthopyroxene and amphibole with minor clinopyroxene and spinel. They show porphyroclastic and recrystallized textures with equigranular-mosaic and protogranular textures. On the basis of mode of occurrence, texture and chemical composition data, the ultramafic rocks in these areas are divided into three types; peridotite(PD), partly serpentinized peridotite(PSP) and serpentinite(SP) according to their degree of serpentinization. Different degree of serpentinized ultramafic rocks are analysed to determine whole rock major elements with XRF, trace and rare earth elements with ICP/MS method, the Activation Laboratories Ltd. in Canada. Incompatible elements and REE analyses of the ultramafic rocks are normalized by C1 Chondrite.

Key word : ultramafic rocks, peridotite(PD), partly serpentinized peridotite(PSP), serpentinite(SP), rare earth element(REE), Gyeonggi Massif.

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3. Discussion and Conclusions

The geochemical data presented in this study cover ultramafic rocks collected from ten locations of the western part of the Gyeonggi Massif in Korea. All the rocks have metamorphism and serpentinization. In this discussion, the question as to which degree the rocks have retained their primary major and trace element composition will be approached first, followed by a discussion on the significance of REE pattern. REE patterns are also discussed in terms of melting models for different sources and processes. Finally, an attempt is made to interpret the geochemical data in terms of petrogenetic and geotectonic processes. The serpentinized ultramafic rocks are characterized by high magnesium number and low aluminium. PD is characterized by low MgO/SiO₂ ratio (<1), low LOI (<9wt%) and plate shape of REE pattern. Whereas, SP have great than 1(MgO/SiO₂), high LOI (<12wt%) and slope shape of REE pattern. PSP have LOI of the intermediate range of 9 and 12wt%. The most of the ultramafic rocks, which predominantly consist with orthopyroxene, olivine, spinel and less amphibole with similar depleted REE pattern. However, some area(e. g, Singjin) is perspectivevely enriched appearance and predominant mineral assemblage is clinopyroxene and olivine. This results suppose the difference of origines. Comparing with global occurrence of ultramafic rocks, the ultramafic rocks in the study area are mineralogically and geochemically similar to mantle-derived ultramafic rocks. It probably suggests that their occurrences of ultramafic rocks in the Gyeonggi Massif are similar to those of Alpine type ultramafic rocks. Furtherer, It may imply the geotectonics of the Korean peninsula relationship with the Chinese continental collision belt.