

Characteristics of detrital chromian spinels from Japanese Islands

Ken-ichiro Hisada[1]; Shoji Arai[2]

[1] Grad. School Life and Envir., Univ. Tsukuba; [2] Dept. Earth Sci., Kanazawa Univ.

Chromian spinels are contained in upper mantle peridotite and Mg-rich igneous rocks. In general, its contents are less than a few %, but provide us important information about petrogenesis. The chromian spinels are also one of representative heavy minerals which suggest us petrology of the source rocks and its tectonic setting. There are few works dealing with such a provenance study using detrital chromian spinels. The reasons seem to be caused by complex petrogenesis and suffered alteration on chromian spinels. Recently Arai et al. (in press) insist that Cr# of chromian spinels can discriminate ocean floor type series from arc type ones, paying special attention to the stratiform ultramafic rocks.

We have investigated occurrence and its tectonic settings of detrital chromian spinels from Japanese Islands for more than ten years. We could confirm the occurrence; Kurosegawa Belt, Southern Kitakami Belt, Hida-mariginal Belt, Joetsu Belt, Maizuru Belt, Northern Shimanto Belt, Southern Shimanto Belt, Kiroko mélange, Izumi Group and Kenseki formations.

The detrital chromian spinels from these belts and rocks, except for Chugoku terrane, have common characteristics. Cr# ranges from 0.2 to 0.9 and Mg# ranges from 0.2 to 0.7, but the concentrated parts fall into 0.4 to 0.6 in Cr# and 0.5 to 0.7 in Mg#. Fe³⁺ is characteristically low (less than 0.1 in Fe³⁺-Cr-Al diagram), and TiO₂ wt % is also lower than 0.5. These lines of evidence suggest that Japanese Islands had been emplaced in the edifice of the arc-trench system since the Silurian times.