

肥後変成岩および西彼杵変成岩に産する超高压クロミタイトの比較 Comparison of UHP chromitites from the Higo and Nishisonogi Metamorphic Rocks, Kyushu, Japan.

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We have found microdiamond - bearing ultrahigh-pressure (UHP) chromitites from two metamorphic terranes in Kyushu: the Higo (HMR)¹ and Nishisonogi (NMR)² Metamorphic Rocks. This paper describes the similarity and difference between the two UHP chromitites. The HMR are located in west-central Kyushu with an E-W trend. They have undergone low P /T metamorphism, however, precursor HP or UHP metamorphism of ca. 250 Ma has been inferred³. The protoliths have affinity to continental shelf deposits⁴, consisting mainly of pelitic gneisses and meta-carbonates with minor metabasites and metaperidotites (partly serpentinite). Chromitite occurs very rarely as a nodular form in serpentinitized metaperidotites which shows spinifex-texture. The NMR is located in western Kyushu with a N-S trend. They have undergone high P /T metamorphism of epidote-blueschist subfacies. They consists mainly of pelitic and psammitic schists with minor basic schists and serpentinites, some of which show a character of serpentinite melange⁵. Detrital zircon from the pelitic schists show the age of 89-86 Ma⁶, whereas zircon from jadeitites in a serpentinite melange does 136 -126 Ma in the core and 84 - 80 Ma in the rim^{7,8}. Chromitite occurs as a deformed schlieren-like layer in serpentinite with no relic minerals. The P-T condition of the HMR has been estimated to be 200 - 600 MPa and 600 - 800 °C^{3,9,10,11,12,13}. Higher pressure and temperature conditions are reported from the following two samples: a sapphirine-bearing granulite^{3,10} as a tectonic block in the spinifex-textured metaperidotite (900 MPa and 950 °C) and a calc-silicate granulite¹³ (900 MPa and 820 °C) intercalating with garnet - biotite gneiss. We newly estimated the peak P-T condition of Al-spinel and chlorite -bearing metaperidotite as 2.0 GPa and 780 - 990 °C. In the case of the NMR, the peak metamorphic condition of the crystalline schists is 1.4 GPa and 520 °C for a garnet galucophanite¹⁴. Jadeitites¹⁵ as tectonic blocks in the serpentinite melange shows the peak condition of 1.5 GPa and 500 °C. Chromite from the HMR has the composition $(\text{Mg}_{0.34}\text{Fe}^{2+}_{0.75}\text{Mn}_{0.02})(\text{Cr}_{0.81}\text{Al}_{0.06}\text{Fe}^{3+}_{0.04}\text{Si}_{0.05})_2\text{O}_4$, whereas that from the NMR has similar composition $(\text{Mg}_{0.33}\text{Fe}^{2+}_{0.65}\text{Mn}_{0.03})(\text{Cr}_{0.84}\text{Al}_{0.12}\text{Fe}^{3+}_{0.04})_2\text{O}_4$ in the core and Fe-rich composition $(\text{Mg}_{0.06}\text{Fe}^{2+}_{0.89}\text{Zn}_{0.02}\text{Mn}_{0.03})(\text{Cr}_{0.85}\text{Al}_{0.12}\text{Fe}^{3+}_{0.04})_2\text{O}_4$ in the rim. Microdiamonds occur as *in situ* inclusions in chromite in both chromitites. They are 1 to 10 μm in size in HMR chromite, and those in NMR chromite is much smaller, mostly <1 μm with small number of larger grains. In both chromitites microdiamonds occur in some cases as numerous aligned grains, making diamond - rich zones. Both microdiamonds are identified with Raman spectra. HMR microdiamonds show a broad peak at 1333 cm⁻¹. NMR microdiamond, also shows a broad peak at 1331 cm⁻¹ with graphite peak at around 1600 cm⁻¹, suggesting partial graphitization. Both UHP chromitites will be deep subduction origin. HMR can be an eastern extension of the Dabie-Sulu UHP terrane in China, however, NMR is more problematic. No corresponding UHP terrane of ca. 80Ma is found around Kyushu. Our findings of UHP chromitites require reexamination of micro-tectonics in Kyushu, a peculiar location of an arc-arc junction at the continental margin.

References 1:Nishiyama et al., JpGU Meeting, S-MP46, 2014; 2: Nishiyama et al., JpGU Meeting, S-CG08, 2014; 3: Osanai, et al., Gondwana Res., 9, 152-166, 2006; 4: Omori and Isozaki, J.Geogr., 120, 40-51, 2011; 5: Nishiyama, Mem. Geol. Soc. Japan, 33, 237-257, 1989; 6: Kouchi, Y., J. Geogr., 120, 30-39, 2011; 7: Mori, et al., JMG, 29, 673-684, 2011; 8: Yui, et al., EJM., 24, 263-275, 2011; 9: Obata et al., Lithos, 32, 135-147, 1994; 10: Osanai et al., JMG., 16, 53-66, 1998; 11: Maki et al., JMPS, 99, 1-18, 2004; 12: Miyazaki, JMG., 22, 793-809, 2004; 13: Maki et al., JMG., 27, 107-124, 2009; 14: Moribe, Mc thesis, Kumamoto U.; 15: Shigeno et al., EJM, 24, 289-311, 2012

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