Japan Geoscience Union Meeting 2014
(28 April - 02 May 2014 at Pacifico YOKOHAMA, Kanagawa, Japan)

SMP46-02 会場:411 時間:4 月 28 日 12:15-12:30

肥後変成岩からのマイクロダイヤモンドを含む超高圧クロミタイト
Microdiamond - bearing UHP chromitite from the Higo Metamorphic Rcoks, Central Kyushu, Japan

西山 忠男 [1*] ; 潮崎 大 [1] ; 惠口 響 [1] ; 吉朝 朗 [1]
NISHIYAMA, Tadao[1*] ; SHIOSAKI, Dai[1] ; EGUCHI, Hibiki[1] ; YOSHIASA, Akira[1]

[1] 熊本大学自然科学研究科
[1]Graduate School of Science and technology, Kumamoto University

Microdiamond-bearing ultrahigh-pressure (UHP) chomitite was newly found from a spinifex-textured metaperidotite in the Higo Metamorphic Rocks (HMR) , Central Kyushu, Japan. This is the first finding of microdiamond from Japanese metamorphic rocks and the second finding in Japan following the first one from a mantle xenolith in a Cenozoic lamprophyre dyke in Shikoku[1]. The HMR represents a low P/T metamorphism of Cretaceous in age, however, the precursor HP or UHP metamorphism of ca. 250Ma has been inferred[2]. A great deal of debate has been done on whether or how the Dabie-Sulu UHP terrane extends eastward to the Korean Peninsula and also to Japan. The HMR is one of the candidates[3] for the eastern extension in Japan, but no definitive evidence has been given yet.

Metaperidotites occur in two localities in the HMR: one at Yamato Town in the biotite zone and the other in Matsubase Town in the garnet-cordierite I zone[4]. The metaperidotites from Matsubase Town show distinct spinifex-texture with decimeter-sized elongated olivine (mostly serpentinized) and enstatite. Those from Yamato Town shows either spinifex-texture or granular texture of finer grains (several mm to 1 cm across), and is strongly serpentinized. The metaperidotite bodies occur in mostly pelitic gneisses as small lenticular bodies about several ten meters in size, which are concordant to the gneissosity. The mineral assemblage of the metaperidotite is olivine (mostly serpentinized) + enstatite with secondary tremolite and antigorite. Talc occurs locally along the cleavage of enstatite. A podiform chromitite occurs in such a strongly serpentinized metaperidotite at Yamato Town as a nodular form of about 10 cm in diameter, in which we found many inclusions of microdiamond 1 to 10 μm in size. We have made four thin sections, polished with colloidal silica, from one chromitite sample, and found many microdiamond inclusions in all thin sections. Microdiamonds occur both in chromite and in nickeline, and they are all monocrystalline. Many euhedral to subhedral grains (mostly 1 μm in size) of microdiamond occurs in chromite, making several lines of aligned grains. Identification of diamond was carried out with an energy dispersive X-ray spectroscopy (EDS) analysis (carbon peak) and Raman spectroscopy with a He-Ne laser. We observed a Raman peak at 1333.5 cm^{-1}, which is comparable to the peak (1332 cm^{-1}) characteristic of diamond. They show no evidence of partial or total graphitization. The occurrence suggests that the striations represent healed cracks and that microdiamonds precipitated from a reduced C-O-H fluid[5,6]. Our finding presents a convincing evidence for the hypothesis that the Higo Metamorphic Rocks is an eastern extension of the Dabie-Sulu UHP terrane in Japan. The second implication of our finding is on the nature of UHP chromitite. Microdiamonds are found from several UHP metamorphic terranes[5,6,7], however, microdiamond-bearing UHP chromitite has been found from ophiolites in non-UHP metamorphic terrane[8], making the occurrence of UHP chromitite as an enigma[9]. The Higo UHP chromitite represents a deep subduction product as indicated by spinifex-texture in the host metaperidotite due to high pressure breakdown of antigorite (serpentine), instead of a product of mantle migration10. Therefore the origin of the UHP chromitite requires a specific interpretation in each case.

References

1. Mizukami, T., et al., Geology, 36, 219-222, 2008; 2. Osanai, Y., et al.,Gondwana Res.,9, 152-166,2006;3: Omori, S., and Isozaki, Y., J. Geogr., 120, 40-51, 2011; 4: Miyazaki, K., JMG,22, 793-809,2004; 5: Liou J.G., et al., J. Asian Earth Sci.,35, 199-231; 6: Dobrzhinetskaya, L.F.,Gondwana Res., 21, 207-223, 2012; 7. Schertle, H-P., and Sobolev, N.V., J. Asian Earth Sci., 63, 5-38, 2013; 8: Yang, J-S., et al., Geology, 35, 875-878, 2007; 9; Arai,S., JMPS, 105, 280-285, 2010; 10; Yamamoto, S. et al., Lithos, 109, 314-322, 2009

キーワード: マイクロダイヤモンド, 超高圧クロミタイト, 肥後変成岩, 超高圧変成岩, スピニフェックス組織, Dabie-Sulu 超高圧変成帯
Keywords: microdiamond, UHP chromitite, Higo Metamorphic Rocks, Ultrahigh-pressure metamorphic rocks, Spinifex-texture, Dabie-Sulu UHP terrane