

Petrology of Oman listvenite : Implications for carbon cycle in the subduction zone

*Toma Takahashi¹, Tomoaki Morishita², Hiroki Sato³, Juan Miguel Guotana², Tatsuhiko Kawamoto⁴, Peter B Kelemen⁵, Jude Ann Coggon⁶, Michelle Harris⁷, Juerg Michael Matter⁶, Katsuyoshi Michibayashi⁸, Eiichi TAKAZAWA⁹, Damon A H Teagle⁶, The Oman Drilling Project Phase 1 science Party

1. Faculty of Geosciences and Civil Engineering, Kanazawa university, 2. Division of Natural Sciences, Graduate School of Natural Science and Technology, Kanazawa university, 3. Faculty of Science, Kyoto university, 4. Department of Geoscience, Faculty of Science, Shizuoka university, 5. Lamont-Doherty Earth Observatory, Columbia university, 6. School of Ocean and Earth Science, National Oceanography Center Southampton, University of Southampton, 7. School of Geography, Earth and Environmental Sciences, Plymouth University, 8. Department of Earth Planetary Sciences, Graduate School of Environmental Studies, Nagoya university, 9. Institute of Science and Technology, Niigata university

Listvenites obtained during the Phase 1 of the Oman Drilling Project can be generally divided into two main groups based on color: red series and green-white series. Although there is a clear color difference, the mineral assemblage is mainly composed of magnesite and quartz. Dolomite occurs as late veins and/or small patches. Opaque minerals are abundant in the red series which occur either as veins or disseminated grains which are commonly enveloped by carbonate minerals and quartz. The opaque minerals are hematite based on Raman spectrometry analysis. In the green-white listvenite series, opaque minerals are very scarce. Greenish portions in both listvenites were observed on a hand sample scale. In the green-white series, dark green and light green portions are present while only light green portions are observed in the red listvenites. These greenish features are interpreted as mainly polyminerally pseudomorphic replacement of orthopyroxene. In the same hole, pyroxene relics in serpentinites exhibit the same shape as with the previously described greenish pseudomorphs. The dark green portions in the green-white listvenites contain fuchsite (Cr-mica) around spinel relics. Silicified relic pyroxenes with fuchsite along relic cleavages are also present in the light green portions. On the other hand, the greenish portions in the red listvenite series are characterized by magnesite with intergranular fuchsite (?). Hematites in the red listvenites have similarities in form with the opaque minerals occurring as discontinuous veinlets in the serpentinite. The combined similarities in the petrographic features suggest that some listvenites were formed from serpentinites. Quartz veins with Ni-bearing magnesite were observed in the red series and were formed in the last stage.

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