

## Origin of variable CaO/Al<sub>2</sub>O<sub>3</sub> in olivine-hosted melt inclusions from Kibblewhite Volcano, Kermadec Arc

\*平井 康裕<sup>1</sup>、田村 芳彦<sup>2</sup>、Kaj Hoernle<sup>3</sup>、Christian Timm<sup>4</sup>、Folkmar Hauff<sup>3</sup>、Reinhard Werner<sup>3</sup>、羽生 毅<sup>2</sup>、Bogdan Vaglarov<sup>2</sup>、常 青<sup>2</sup>、宮崎 隆<sup>2</sup>、木村 純一<sup>2</sup>

\*Yasuhiro Hirai<sup>1</sup>, Yoshihiko Tamura<sup>2</sup>, Kaj Hoernle<sup>3</sup>, Christian Timm<sup>4</sup>, Folkmar Hauff<sup>3</sup>, Reinhard Werner<sup>3</sup>, Takeshi Hanyu<sup>2</sup>, Bogdan Vaglarov<sup>2</sup>, Qing Chang<sup>2</sup>, Takashi Miyazaki<sup>2</sup>, Jun-Ichi Kimura<sup>2</sup>

1. 金沢大学大学院 自然科学研究科、2. 海洋研究開発機構、3. ゲオマール海洋研究所、4. GNSサイエンス

1. Graduate School of Natural Science and Technology, Kanazawa University, Japan, 2. Japan Agency for Marine-Earth Science and Technology (JAMSTEC), Yokosuka, Kanagawa, Japan, 3. GEOMAR Helmholtz Centre for Ocean Research, Kiel, Germany, 4. GNS Science, Lower Hutt, New Zealand

During R/V SONNE expedition SO-255 mafic basaltic to magnesian andesitic lavas containing melt inclusion hosting forsteritic olivines (Fo<sub>90.3-92.4</sub>) were recovered from Kibblewhite Volcano, southern Kermadec Arc. The re-homogenized melt inclusions have compositions similar to primitive basalt (49.6–52.0 wt.% SiO<sub>2</sub>; 12.7–15.9 wt.% MgO). Their CaO/Al<sub>2</sub>O<sub>3</sub> values, however, range from 0.9 to 1.6, which cannot be explained by melting of lherzolite. Moreover, CaO/Al<sub>2</sub>O<sub>3</sub> values in the melt inclusions correlate negatively with Ni contents of their host olivines suggesting that the high CaO/Al<sub>2</sub>O<sub>3</sub> values result from interaction between mafic melts and subarc lithospheric mantle. Prior to the interaction the mafic magma must have had high Ni contents and low CaO/Al<sub>2</sub>O<sub>3</sub> values, thus they crystallized high Ni olivines trapping low CaO/Al<sub>2</sub>O<sub>3</sub> melt inclusions. During the interaction the olivines crystallized from the mafic magmas and its latent heat assimilated pyroxenes from the surrounding lithospheric mantle. This assimilation of pyroxenes allowed the Ni content of the melt to decrease and CaO/Al<sub>2</sub>O<sub>3</sub> to increase while buffering the the Mg-number of the mafic magmas during the ascent. Thus, magmas during and after the interaction could crystallize low Ni olivines bearing high CaO/Al<sub>2</sub>O<sub>3</sub> melt inclusions.

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