The coloration Factor of Pale Blue Sepiolite in amygdales in Higashimatsuura basalt from Kabeshima island, Saga Prefecture, SW Japan

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The alkali basalts known as the Higashi-Matsuura basalts are widely distributed on Kabeshima Island, Yobuko area, Saga Prefecture, and pale blue sepiolite has been found in amygdales in the Higashi-Matsuura basalts on the island. A white to light-green sepiolite has been reported previously in Higashi-Matsuura basalts from near Karatsu city (Ishibashi, 1974), but not the sepiolite with a pale blue color. In this study, to investigate of color of the pale blue sepiolite, we analyzed the pale blue sepiolite chemical composition using EPMA, LA-ICPMS and TEM-EDS.
The amygdale minerals in the alkali basalt consist of sepiolite, ilmenite, calcite, Mn oxides and chlorite-like mineral. The pale blue sepiolite has a spongy texture with pores less than 0.5 μm in diameter on the mineral surface and occurs in radial clusters 5-10 μm thick on a yellowish-brown chlorite-like mineral. Quantitative analysis of the pale blue sepiolite showed that it consists mainly of 46.48 wt.% SiO_2, 16.89 wt.% MgO, and 4.69 wt.%Al_2O_3. The trace transition-metal elements detected in the pale blue sepiolite in microscale chemical analysis using LA-ICPMS that might cause coloration in sepiolite are 0.403 wt.% Mn, 0.392 wt.% Fe^{3+}, 0.145 wt.% Cu, 0.036 wt.% Ti, 0.012 wt.% Cr and 0.010 wt.% Ni. However, Fe and Mn are not detected in the nano scale chemical analysis of sepiolite using TEM-EDS. Therefore, Fe and Mn detected in microscale chemical analysis are likely to be due to contamination with other minerals that coexist with the sepiolite, such as Mn oxides and chlorite-like mineral, with Cu being the most abundant transition metal element in the sepiolite.
The result of this study suggests that the transition-metal element Cu is responsible for the pale blue color of the sepiolite. However, Further research is needed to determine whether sepiolite which crystal lattice Cu-containing exhibits pale blue color, because it is no report on the color of Cu bearing sepiolite.

Keywords: Kabeshima Island, sepiolite, copper, alkali basalt