

Saline fluids recorded in jadeitites in subduction-zone melanges of southwest Japan

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Slab-derived fluids play essential roles in mass transfer along subduction-zone channels between the subducting slab and mantle wedge (e.g., Bebout 2013 *Metasomatism and the chemical transformation of rocks*; Spandler and Pirard 2013 *Lithos*). Salinity of such slab-fluids probably affects solubility and fluid-rock partitioning of elements; therefore, it remains to be investigated in various rocks. Jadeitite is a rock composed mainly of jadeite (sodium pyroxene, NaAlSi₂O₆) and occurs typically in serpentinite mélanges intercalated to high-pressure and low-temperature metamorphic belts. This curious rock is thought to be the product of direct precipitation from aqueous fluids and/or of fluid-induced metasomatism of a protolith (Harlow *et al.* 2007 *Geology of gem deposits*, Tsujimori and Harlow 2012 *Eur J Mineral*, and references therein). Fluid inclusions are commonly observed in jadeitites, and they may provide information about the fluid composition in subduction-zone mélanges. We determined major components and salinity of fluid inclusions in the jadeitites collected from eight localities in Japan: Omi-Itoigawa (Omi-Renge belt), Oya and Osa (Suo belt), Kochi (Kurosegawa belt), Mie and Tone (Nishisonogi metamorphic rocks), and Shimonita and Yorii (the origin unclear). In all of the studied rocks, primary fluid inclusions consist of a liquid phase and a gas bubble. Raman spectra show the presence of H₂O liquid and vapor with or without minor CH₄ gas. The freezing point of the liquid phase indicates high-salinity (up to 8 wt% NaCl equivalent) of the primary fluid inclusions. The salinity varies among the localities of the jadeitite. For example, the salinity of the primary fluid inclusions is about 7.1 ± 0.1 wt% NaCl equivalent in the albite jadeitite from Oya and about 4.6 ± 1.2 wt% NaCl equivalent in quartz inclusions bearing jadeitite from Tone. Some jadeitite samples contain secondary CH₄-rich fluid inclusions along healed microcracks. The presence of minor CH₄ is also reported in the saline fluids inclusions with 5.1 ± 1.9 wt% NaCl equivalent from the Myanmar jadeitite (Shi *et al.*, 2005 *Geochem J*). The present findings suggest that saline fluids with or without CH₄ are common in subduction-zone mélanges in Japan as well as in Myanmar. The reduced conditions can be caused by serpentinization processes. This is contrast to the CO₂-bearing saline fluids in the peridotite xenoliths from fore-arc mantle wedge (Kawamoto *et al.*, 2013 *PNAS*). The high-salinity of the slab-fluids probably enhances the mobility of elements such as Pb in subduction-zone channels (Keppler, 1996 *Nature*, Shigeno *et al.*, 2012 *Eur J Mineral*).

Keywords: saline fluid, jadeitite, fluid inclusion, serpentinite mélange, subduction zone