Sr-bearing silicate minerals in pumpellyite rock from the Wakasa district, Tottori Prefecture, Japan.

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In the Sangun metamorphic belt, southwest Japan, jadeitite blocks within serpentinite body or serpentinite melange have been reported from the Itoigawa-Ohmi, Oya, Wakasa and Osayama districts. Of these localities, only from the Itoigawa-Ohmi district, some new Sr silicate minerals have been discovered in jadeitite and its related rocks in recent 30 years; i.e. ohmilite from an albitite by Komatsu et al. (1973), strontio-orthojoaquinite from the same albitite by Chihara et al. (1974), itoigawaite from a jadeitite by Miyajima et al. (1999), rengeite from a jadeitite by Miyajima et al. (2001), matsubaraite from a jadeitite by Miyajima et al. (2002), and niigataite from a prehnite rock by Miyajima et al. (2003). All of these minerals had not been reported from anywhere other than the Itoigawa-Ohmi district. In the present study, new occurrence of itoigawaite and niigataite was found in a jadeite-bearing pebble from the Wakasa district, Tottori Prefecture, Japan.

Itoigawaite, $SrAl_2Si_2O_7(OH)_2.H_2O$, is the Sr analogue of lawsonite. Its type specimen is vivid blue and occurs as a thin veinlet cutting jadeitite. The vein-filling constituents are prismatic jadeite crystals along the vein wall, and aggregates of itoigawaite with interstitial natrolite. Miyajima et al. (1999) reported that no compositional variation was observed within single grains or between adjacent grains of itoigawaite, and its chemical composition is close to the ideal formula with only a minor replacement with Ca; that is, Sr/(Sr+Ca) = 0.98-0.96.

Niigataite, $CaSrAl_3(Si_2O_7)(SiO_4)O(OH)$, is the Sr analogue of clinozoisite and a new member of the epidote group that has two distinct sites commonly occupied by Ca ions: A(1) and A(2) sites. In niigataite, Sr ions occupy the majority of the A(2) sites in clinozoisite by replacing Ca. Type niigataite was found in a boulder of the prehnite rock (Miyajima et al., 2003). The rock is mainly composed of fan-shaped aggregates of platy prehnite crystals and prismatic to acicular diaspore crystals, and its minor constituents are chlorite, zircon, sulfide minerals and niigataite-clinozoisite series minerals. The niigataite occurs interstitially within chlorite or closely associates with Sr-bearing clinozoisite.

In the present study, the Ca-rich itoigawaite, associated with pumpellyite-(Al), has been newly found in veins cutting jadeite-bearing pumpellyite rocks and jadeitites from the Wakasa district. Across one pebble sample of pumpellyite rock, for example, a pale-blue vein, 1-2mm wide, is running. Colorless to pale-yellow colored patches are observed in the vein. The pale-blue parts of the vein are mainly composed of prismatic Ti-bearing jadeite crystals. Celsian crystals are distributed along the margins of the patches and irregularly-shaped aggregates composed of itoigawaite and pumpellyite are found in the inner parts of the patches. Both of the itoigawaite and pumpellyite occur as fine fibrous laths and seem to be intergrown. The pumpellyite contains 1-2 wt% Na_2O, and is considered to be the Na-richest specimen of pumpellyite to my knowledge. Itoigawaite also occurs as the pumpellyite-free zone which has wide chemical inhomogeneity. The Sr/(Sr+Ca) ratio varies from 0.85 to 0.52 in the present itoigawaite.

The niigataite was also found in the same sample of pumpellyite rock. Except for the vein described above, the sample looks like a greenish nephritic rock but it is mainly composed of very fine grains of pumpellyite, chlorite, clinozoisite and jadeite. Grossular, rutile, titanite and zircon grains are also contained in the sample. The clinozoisite contains up to 4.5 wt% SrO, and is surrounded by the Sr-richer niigataite rims. The present niigataite is closely associated with the Sr-bearing clinozoisite (XSr=0.11 on the average) and its chemical composition is little Sr-richer (XSr=0.79 on the average) than that from the Itoigawa-Ohmi district (XSr=0.72), where the XSr represents the Sr/(Sr+Ca) ratio in the A(2) site.