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A pictorial introduction to coarse-grained symplectites in low-temperature jadeitite from Guatemala

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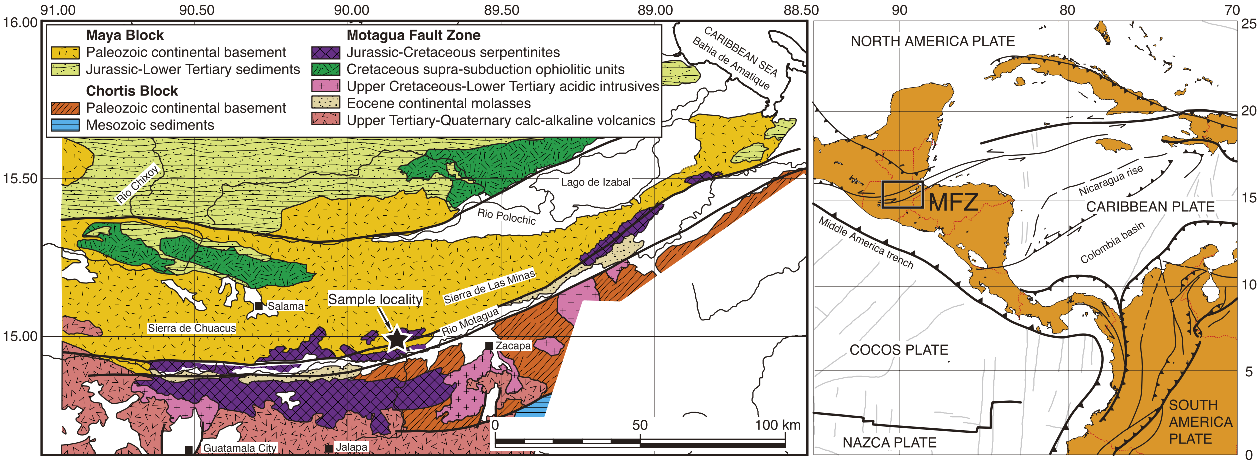
Symplectite textures are common product of retrogression in the intermediate- to high-temperature metamorphic rocks such as granulite and eclogite, and contain important information on the *P-T* histories. Their formation mechanisms are generally attributed to the fast nucleation of symplectite minerals replacing reactant peak-stage mineral due to rapid changes in pressure and/or temperature. Alternatively, their textural characteristics are controlled by kinetics and dynamics of metamorphic recrystallization. Although an infinite number of symplectite variations have been known in many high-grade metamorphic rocks, here we present a rare example of coarse-grained symplectite in low-*T* jadeitite from the northern Motagua Fault Zone（MFZ）of Guatemala（Fig.1）. This region is one of the few jadeitite localities in the world to have produced excellent quality of 'Jade'. As shown in figures, coarse-grained jadeitite（Fig.2）contains spectacular symplectitic intergrowth of albite（Ab）+ analcime（Anl）± nepheline（Ne）that formed by jadeite breakdown（Figs.3 and 4）. Textural relations and retrograde phase assemblage suggest that precursor jadeite has reacted with H_2O-rich fluid to form symplectite under the approximate *P-T* condition at $P < 0.7$ GPa and $T < 400$ ℃. The development of symplectite may have been promoted by fluid infiltration most probably from serpentinite to jadeitite.



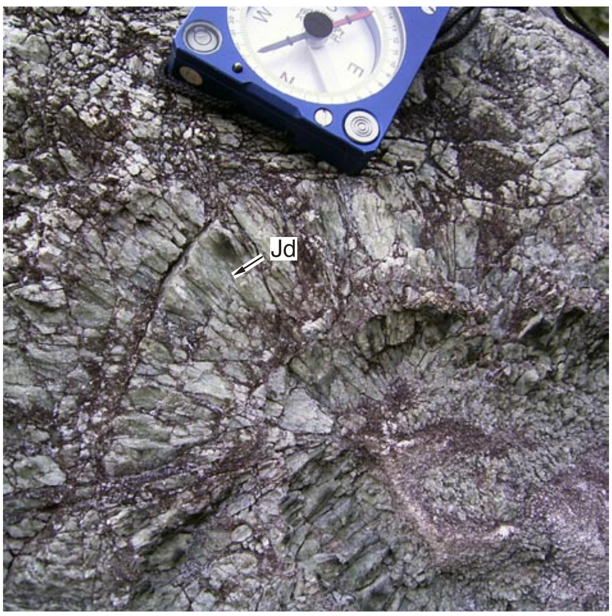


Fig.1. Simplified geologic map of the Motagua Fault Zone (MFZ) (modified from Beccaluva et al., 1995) and panorama of southward view of the valley of the Rio Motagua. The MFZ is part of a suture zone juxtaposing the Maya and Chortis continental blocks; the left-lateral strike-slip faults separate the present-day North American plate from the Caribbean plate. Serpentinites are exposed on either side of the Rio Motagua; jadeitite and medium- to high-*P* metamorphic rocks such as amphibolite, blueschist and eclogite occur as tectonic blocks in antigorite serpentinites.

Fig.2. The macroscopic texture of the symplectite-bearing jadeitite in the northern MFZ. Multiple vein-swarms of coarse-grained jadeite (Jd) with a radiating habit comprise monomineralic jadeitite; single jadeite crystal reaches up to 8 cm in length. Geologic compass（7 cm in length）for scale.

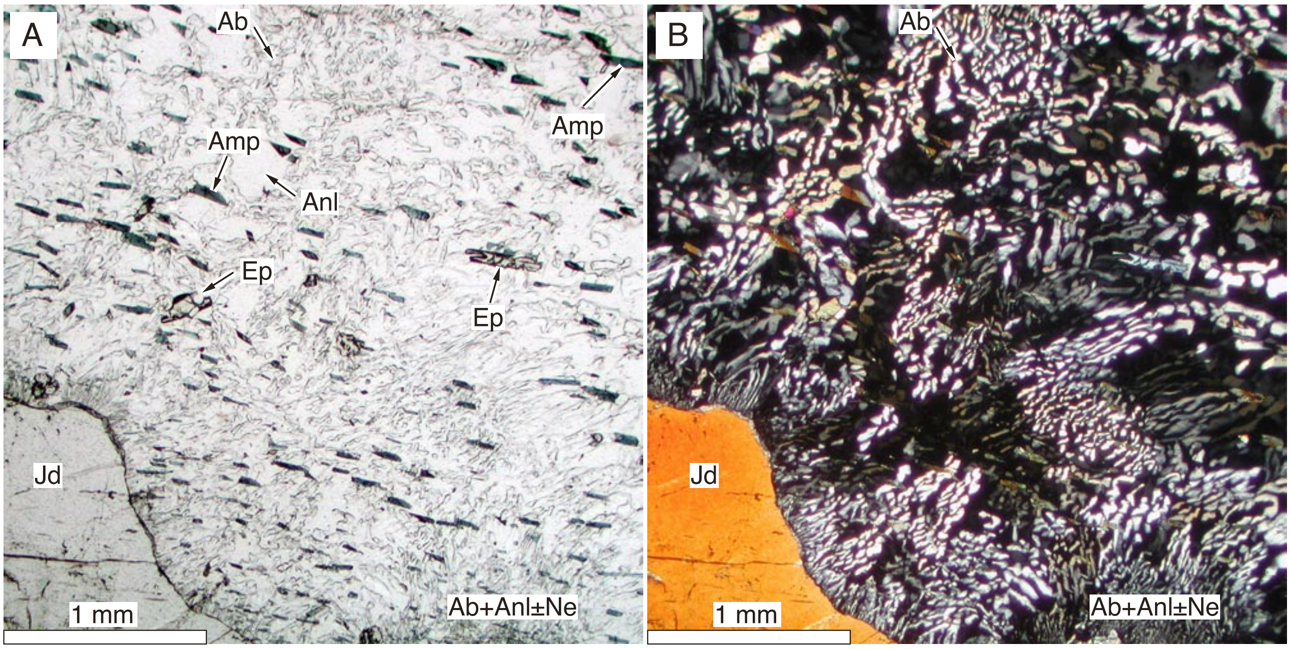


Fig.3. Photomicrograph of the symplectite after jadeite. (A) Plane-polarizer view of the albite (Ab) - analcime (Anl) - nepheline (Ne) symplectite around jadeite (Jd). Minor amount of oriented taramitic amphibole (Amp) and epidote (Ep) are involved within the vermicular networks of the symplectite. Same textural relations have been known in the jadeitite from the northern MFZ (Figure 5a of Harlow, 1994). (B) Crossed-polarizer view of (A). Symplectite-forming minerals possess identical extinction positions.

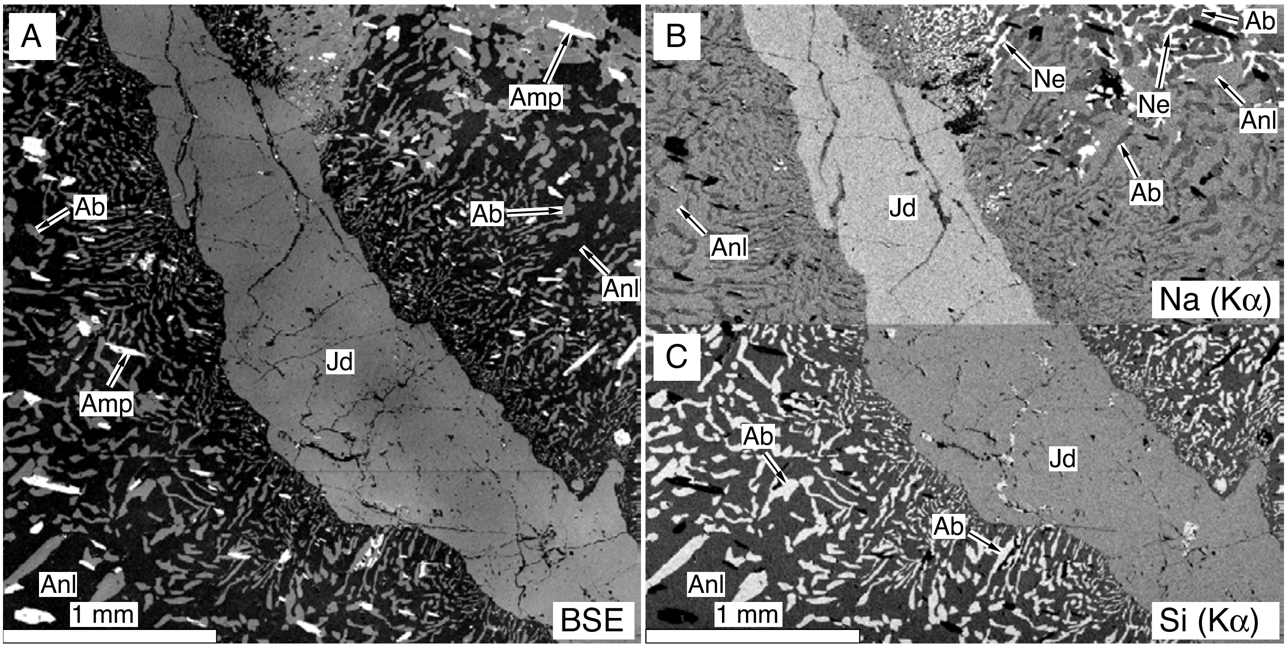


Fig.4. Electron microprobe scanning images of the symplectite around relict jadeite. (A) Back-scattered electron (BSE) image showing textural relations. The size and spacing of symplectite-forming minerals become smaller toward jadeite. Jadeite ($Jd_{94-97}Aug_{2-4}Ae_{0-3}$) is subtlety zoned. (B) X-ray image of Na (Kα) intensity of the upper half of (A). Nepheline is locally intergrown with other phases in symplectite. (C) X-ray image of Si (Kα) intensity of the lower half of (A). Vermicular albite grains are roughly perpendicular orientated to the reacting interfaces.

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