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PSEUDOMORPHS AFTER LAWSONITE IN BLUESCHISTS FROM SYROS, GREECE REVEAL RELATIVE ELEMENT MOBILITY

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Syros is part of the Attic-Cycladic blueschist belt and consists principally of marbles, schists, and metabasites that have been metamorphosed from the blueschist- to eclogite-facies at about 52 Ma with a greenschist facies overprint beginning at about 25 Ma (Keiter et al., 2011). Distinct, whitish clusters of sub-millimeter-sized grains organized into orthorhombic polyhedral shapes occur in a variety of the blueschists. These clusters are interpreted to be pseudomorphs after lawsonite based on their shape, chemistry, and the presence of remnant lawsonite in a number of the clusters. A considerable range in observed pseudomorph modes reflects both the rock composition and the extent of greenschist overprinting. Most pseudomorphs contain epidote group minerals (zoisite/clinozoisite/epidote), similar to the composition of ideal lawsonite, except for added Fe and lost water. Many contain white mica (phengite, paragonite), which requires the addition of K and/or Na to the original lawsonite. In some cases, the pseudomorph is largely mica, so that Ca must have been lost to an epidote mineral or amphibole in the matrix. Although Al is concentrated in the pseudomorphs and, therefore, must have been somewhat mobile during the growth of lawsonite, the preservation of the pseudomorphs appears to be due to the relative immobility of Al during the pseudomorphing reactions, with K, Na, and Fe moving to the pseudomorphs and Ca and H_2O leaving. The only source of K in these rocks is phengite, which should become less rich in celadonite with the increasing temperature that was needed to drive lawsonite breakdown. Phengite in the pseudomorphs typically has a lower celadonite content than phengite in the matrix. It appears that the mica has changed its composition by breakdown, K diffusion, and regrowth in the pseudomorph. Textures indicate that garnet porphyroblasts grew before or during lawsonite growth. Thermodynamic models suggest that the early garnet growth, facilitated by Mn in the rocks (and garnet cores), may nevertheless call for higher temperatures or lower water content along the subduction PT path for these rocks than would be required if garnet were absent.

Session No. 306--Booth# 312

T168. Subduction, Fluids, Accessory Minerals, and Trace Elements: A Celebration of Sorena Sorensen's Career (Posters)
Wednesday, 4 November 2015: 9:00 AM-6:30 PM

Exhibit Hall (Baltimore Convention Center)

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