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## The Petrology and Geochemistry of Listwaenite in the Sartohay Ophiolitic Melange of West Junggar, Xinjiang, China

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### 1 Abstract

The west Junggar, located in the eastern part of Balkash-Junggar tectonic province, is a major component of the core of the Central Asian metallogenic region. This area is characterized by occurrences of ophiolitic mélanges, such as the Sartohay ophiolitic mélange in the NE and the Tangbale ophiolitic mélange in the west. As a hydrothermal alteration product of serpentinite in the Sartohay ophiolitic mélange, listwaenite lenses are gold-mineralized and crop out on surface in the ophiolitic mélange via weathering of exhumated hanging wall of fault zone. Listwaenite is mainly composed of magnesite, quartz, dolomite, and trace amounts of mariposite, chromian spinel, talc and sulfide. A vertical thermal gradient model for the hydrothermal alteration shows that serpentinite would first be transformed to talc schist, then into listwaenite as the ophiolite slices continued to rise along shear zone, with XCO<sub>2</sub>, oxygen and sulfur fugacity increase and temperature decrease. Both serpentine and magnetite were progressively destroyed during the transformation from serpentinite to talc schist, and

completely vanished in listwaenite, while mariposite generated in weakly deformed to mylonitized listwaenite.

Concentrations of most trace elements including high field strength elements and metallogenic elements, increasing from undeformed, through weakly deformed, to mylonitized listwaenite, show a positive correlation with deformation degree and content of apatite, rutile, monazite, zircon and sulfide in listwaenite. The shear zone served as pathways for percolation and accumulation of fluid and trace elements during the metasomatism from serpentinite to listwaenite. Compared to undeformed listwaenite, mylonitized listwaenite will be more favorable to be fractured and brecciated due to more intense shearing, which caused strong metasomatic reaction and then induced trace element-bearing mylonitized listwaenite.

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