

# Variations in composition and abundance of white mica in the hydrothermal alteration system at Jiama, Tibet, as revealed by infrared reflectance spectroscopy

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**Abstract:** Short-wave infrared (SWIR) spectral reflectance of hydrothermally altered hornfels in the cores at Jiama porphyry-skarn copper deposit was measured with a portable SVC-1024 infrared spectrometer. The Al-OH band was used to derive information on the octahedral Al content and abundance of white mica (sericite) in the hydrothermal alteration and mineralization system. The range of the Al-OH band wavelength from 2196 nm to 2214 nm corresponds to the content of the copper in orebody approximately from lean ore to bonanza. The wavelength of the Al-OH band of white mica varies from 2205 nm to 2210 nm, the content of the copper could arrive minimum grade. The wavelength of Al-OH band of white mica is greater than 2210 nm, the content of the copper increases quickly, but the samples with quantities copper decrease. Furthermore, the spectral reflectance data show that the compositional variation of white mica is spatially related to hydrothermal alteration zoning, such that phengitic white mica tends to occur in 1) main upflow fluid channel, 2) intensely altered hornfels, 3) Cu or Cu-Mo mineralization, whereas muscovitic white mica was formed preferentially distal to massive sulfide mineralization on the margin of the footwall alteration system. Some changes occur in the drillholes close to the center of the porphyry, the wavelength of white mica shows wave-vibration, which evident the magma intrusion periods. According to the analysis of the 14 drillholes about the wavelength vibration of white mica, it can explain the truth about various quartz vein on cores, at least 5 periods magma intrusion can be shown. The result suggest that Al-OH band wavelength, and therefore the octahedral Al content, of white mica can be used as 1) vectors to mineralization to map the hydrothermal system, 2) correlation to main Metallogenic element to analyse the chemistry content, 3) indicator to magma intrusion activity, at Jiama, Tibet.

**Keywords:** White mica, Jiama, Hydrothermal alteration, Infrared spectral reflectance