Raman Microprobe Spectroscopy of Halloysite

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Abstract: The Raman spectra of a tubular halloysite originating from Matauri Bay, New Zealand, have been obtained using a Renishaw 1000 Raman microscope system. The Raman microprobe enables the Raman spectra of crystals as small as 0.8 μ m diameter to be obtained over the complete wavelength range and allows spectral variations along the different crystal axes to be studied. Three bands in the hydroxyl stretching region were observed at 3616.5, 3623.4 and 3629.7 cm⁻¹ and are attributed to the inner hydroxyls of the shared lower plane of the octahedral sheet of the halloysite. Two bands at 3698.2 and 3705 cm⁻¹ were obtained for the outer hydroxyls of the unshared outer octahedral plane. The relative intensity of the 3629.7 cm⁻¹ band varied according to the tube orientation. Lattice vibrations of the halloysite were also found to be orientation-dependent.

Key Words: Halloysite • Kaolinite • Lattice Vibrations • Raman Microprobe • Raman Spectroscopy

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