
Fourier Transform Raman Spectroscopy of Kaolinite, Dickite and Halloysite

Ray L. Frost

Centre for Instrumental and Developmental Chemistry, Queensland University of Technology 2 George St, Brisbane, GPO box 2434 Qld 4001, Australia

Abstract: The vibrational modes of clay minerals are uniquely accessible to FT Raman spectroscopy, but this potentially powerful technique has found limited application to the study of clay mineral structure. Raman spectra in the 50 to 3800 cm^{-1} region were obtained for a number of kandite clays. The kandite clay minerals are characterised by relatively intense bands centred at 142.7 cm^{-1} for kaolinite, 143 cm^{-1} for halloysite and 131.2 cm^{-1} for dickite with prominent shoulders at 129, 127, and 120 cm^{-1} respectively. These vibrational modes are attributed to the O-Al-O and O-Si-O symmetric bends. Differences in the lattice modes for the kandite clay minerals in the 200 to 1200 cm^{-1} were obtained. Four OH bands were obtained for kaolinite 3621, 3652, 3668, and 3695 cm^{-1} ; three OH bands were found for a selection of dickites and halloysites. The San Juan Dickite and the Eureka Halloysite show further resolution of the low frequency 3620 cm^{-1} hydroxyl band. This splitting is attributed to variation in the position of the inner hydroxyls. Variation in band intensity and position was found to be sample dependent.

Key Words: Dickite • FT Raman spectroscopy • Halloysite • Infrared spectroscopy • Kandite clay • Kaolinite

Clays and Clay Minerals; April 1995 v. 43; no. 2; p. 191-195; DOI: [10.1346/CCMN.1995.0430206](https://doi.org/10.1346/CCMN.1995.0430206)

© 1995, The Clay Minerals Society

Clay Minerals Society (www.clays.org)
