
Characterization of Octahedral Substitutions in Kaolinites Using Near Infrared Spectroscopy

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Abstract: Fourier transform infrared (FTIR) spectroscopy investigations in the near infrared (NIR) region of synthetic and natural kaolinites with various octahedral substitutions have been carried out in order to elucidate the relationships between the substituted cations and specific features of the NIR spectra. The combination modes of the OH stretching and bending vibrations characterizing Fe(III), Ga(III) and Cr(III) octahedral substitutions are identified in the NIR region at 4466, 4498 and 4474 cm^{-1} , respectively, and the first overtones of the OH stretching vibrations at 7018, 7018 and 6986 cm^{-1} , respectively. As far as we know, the bands of kaolinites containing Ga(III) or Cr(III) have not been reported yet. For both Ga(III) and Cr(III), the NIR observations explain why the bending vibration bands of AlGaOH and AlCrOH groups are not observed in the middle infrared (MIR) region.

Key Words: Kaolinites • Near Infrared Spectroscopy • Octahedral Substitution

Clays and Clay Minerals; February 1999 v. 47; no. 1; p. 103-108; DOI: [10.1346/CCMN.1999.0470111](https://doi.org/10.1346/CCMN.1999.0470111)

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