

The basic copper arsenate minerals olivenite, cornubite, cornwallite, and clinoclase: An infrared emission and Raman spectroscopic study

WAYDE N. MARTENS,¹ RAY L. FROST,^{1,*} J. THEO KLOPROGGE,¹ AND PETER A. WILLIAMS²

¹Centre for Instrumental and Developmental Chemistry, Queensland University of Technology, GPO Box 2434, Brisbane, Queensland 4001, Australia

²School of Science, Food, and Horticulture, University of Western Sydney, Locked Bag 1797, Penrith South DC, New South Wales 1797, Australia

ABSTRACT

Molecular structures of the basic copper arsenate minerals olivenite, cornubite, cornwallite, and clinoclase were studied using a combination of infrared emission spectroscopy and Raman spectroscopy. Infrared emission spectra of the basic copper arsenates were obtained over the temperature range 100 to 1000 °C. The IR emission spectra of the four minerals are different, in line with differences in crystal structure and composition. The Raman spectra are similar, particularly in the OH-stretching region, but characteristic differences in the deformation regions are observed. Differences are also observed in the arsenate stretching and bending regions. Infrared emission studies show that the minerals are completely dehydroxylated by 550 °C.