

## **Temperature dependence of IR absorption of OH species in clinopyroxene**

**YAN YANG, QUNKE XIA,\* MIN FENG, AND PEIPEI ZHANG**

CAS Key Laboratory of Crust-Mantle Materials and Environments, School of Earth and Space Sciences,  
University of Science and Technology of China, Hefei 230026, China

### **ABSTRACT**

The behavior of structural OH in clinopyroxene (augite and omphacite) during successive heating has been investigated by in situ micro-FTIR measurements under temperatures ranging from room temperature to 500 °C at 100 °C increment. The first group of OH band (3620–3640  $\text{cm}^{-1}$ ) exhibits a systematic decrease of peak position upon successive heating, while the other two groups (3520–3535 and 3450–3465  $\text{cm}^{-1}$ ) show only little change. Both augite and omphacite display a decrease of integral absorbance of OH fundamental stretching vibration upon successive heating. The IR spectra of OH band are reversible when the temperature decreases from 500 °C to room temperature, suggesting that changes in IR indicate changes in molecular state of OH. Based on: (1) the decreases of integral absorbance of OH bands with increasing temperature, and (2) comparison with Paterson's relationship (Paterson 1982), we suggest that OH absorption coefficients are temperature dependent, so it is necessary to apply different absorption coefficients when determining OH content from Beer-Lambert law at different temperatures and sample temperatures should be reported in quantitative IR studies

**Keywords:** IR, varying temperature, OH, clinopyroxene