*American Mineralogist, Volume 88, pages 1657–1662, 2003*

# Determination of molar absorptivity of IR fundamental OH-stretching vibration in rhyolitic glasses

**SATOSHI OKUMURA,[1,*] MICHIHIKO NAKAMURA,[2] AND SATORU NAKASHIMA[1]**

[1]Interactive Research Center of Science, Graduate School of Science and Engineering, Tokyo Institute of Technology, Meguro-ku, Tokyo 152-8551, Japan

[2]Institute of Mineralogy, Petrology, and Economic Geology, Graduate School of Science, Tohoku University, Aoba-ku, Sendai 980-8578, Japan

## ABSTRACT

Molar absorptivity of the infrared (IR) fundamental OH-stretching vibration band at 3550 $cm^{-1}$ was determined for rhyolitic glasses. Five obsidian samples, unheated and heated at 500–700 °C using an internally heated pressure vessel, were used to evaluate the dependence of the molar absorptivity and final quenched $H_2O$ speciation on $H_2O$ contents and temperature. Water contents of the obsidians were measured by Karl-Fischer titration first, then the amount of unextracted $H_2O$ was calibrated by IR spectroscopy and a conventional vacuum extraction method. Total $H_2O$ contents of the obsidians were determined to be 0.24–1.25 wt%. IR spectra of the unheated and heated obsidian samples were obtained using an FT-IR microspectrometer. We determined the molar absorptivity for the 3550 $cm^{-1}$ band to be 75 ± 4 L/mol/cm without significant dependence on the $H_2O$ contents and heating temperature. This value can be used to determine precise $H_2O$ contents up to 1.25 wt% in rhyolitic volcanic glasses.