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# Determination of molar absorptivities for infrared absorption bands of $H_2O$ in andesitic glasses

**CHARLES W. MANDEVILLE,[1,*] JAMES D. WEBSTER,[1] MALCOLM J. RUTHERFORD,[2] BRUCE E. TAYLOR,[3] ADRIAN TIMBAL,[3] AND KEVIN FAURE[4]**

[1]American Museum of of Natural History, Central Park West at 79th St. New York, New York 10024-5192, U.S.A.
[2]Department of Geological Sciences, Brown University, Box 1846, Providence, Rhode Island 02912, U.S.A.
[3]Geological Survey of Canada, 601 Booth Street, Ottawa, Ontario K1A0E8, Canada
[4]Institute of Geological & Nuclear Sciences, 30 Gracefield Rd. Lower Hutt, New Zealand

## ABSTRACT

We have determined infrared molar absorptivities for water absorption bands in Fe-bearing and Fe-free andesitic glasses. Water dissolves in andesitic glasses as both hydroxyl groups and molecular water as observed in other silicate glasses. Concentrations of molecular water and hydroxyl species are a strong function of total water content. IR molar absorptivities for Fe-bearing andesite are $\varepsilon_{3570} = 62.32 \pm 0.42$ L/mol·cm, $\varepsilon_{4500} = 0.79 \pm 0.07$ L/mol·cm, $\varepsilon_{5200} = 1.07 \pm 0.07$ L/mol·cm, and $\varepsilon_{1630} = 42.34 \pm 2.77$ L/mol·cm. Molar absorptivities for Fe-free andesite are $69.21 \pm 0.52$ L/mol·cm for $\varepsilon_{3570}$, $0.89 \pm 0.07$ L/mol·cm for $\varepsilon_{4500}$, $1.46 \pm 0.07$ L/mol·cm for $\varepsilon_{5200}$, and $52.05 \pm 2.85$ L/mol·cm for $\varepsilon_{1630}$. Molar absorptivities show significant compositional dependencies that can be predicted based on tetrahedral cation ($Si^{+4}$, $Al^{+3}$)/total cation fraction.