

Exploring the potential of Raman spectroscopy for crystallochemical analysis of complex hydrous silicates

L. LEIBNER, F. KEILFLUG, A. WATENPHUL, J. SCHLÜTER,
AND B. MIHAILOVA*

Department of Earth Sciences, University of Hamburg,
Grindelallee 48, 20146 Hamburg, Germany
(*boriana.mihailova@uni-hamburg.de)

The presence of light elements in complex hydrous silicates with more than one crystallographically distinguished non-tetrahedral positions hinders the proper application of electron microprobe (EMP) analysis for chemical analysis and calls for alternative analytical methods to determine the occupation of various crystallographic positions. The potential of Raman spectroscopy (RS) to be used for such purposes has been explored by combined EMP and RS analyses of two mineral supergroups: tourmalines and amphiboles, which are of great importance not only for geosciences as "geological DVDs" but also for materials and environmental science. Our first results indicate that the chemistry on the non-tetrahedral positions substantially influences the H-O bond stretching and the SiO_4 -ring-breathing modes, which both produce strong easy-to-be-detected Raman scattering.

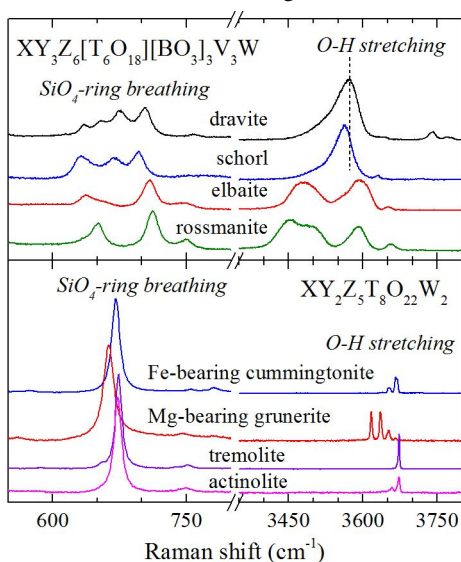


Fig.1. Raman spectra of tourmaline and amphibole species with chemical compositions close to the corresponding end members.