



Raman and infrared spectroscopy of kaersutite and certain common amphiboles

Andrei Ionuț Apopei¹, Nicolae Buzgar¹, Andrei Buzatu¹

¹ "Al. I. Cuza" University of Iași, Faculty of Geography and Geology, Department of Geology, 20A Carol I Blv., 700505 Iași, Romania

Abstract

Raman and infrared spectral studies were performed on six natural minerals from the double-chain silicate group. We analyzed samples of grunerite, actinolite, tremolite, pargasite (+kaersutite) and riebeckite in order to determine the spectral differences between them and to identify the vibrations that occur. Also, for one sample thought to be pargasite we obtained the Raman spectrum of kaersutite, while another sample was determined as a Ti-rich pargasite, since the difference between these two minerals consists in the presence of more than 0.50 apfu ^VTi in kaersutite (titaniferous calcic amphibole). The Raman spectrum of kaersutite exhibits characteristic bands of the ^VTi-OH vibration around 580–590 cm⁻¹ and 750 cm⁻¹. These two bands are stronger than the symmetric stretching vibration of the Si-O_b-Si (ν_1), which arises as the strongest band in all other amphibole minerals of the present study, around 650–670 cm⁻¹. Both Raman and infrared spectra of all the analyzed samples reveal the presence of Fe²⁺, Mg²⁺ or other cations in the octahedral sites, displaying distinct bands in the ~300–450 cm⁻¹ spectral region, as well as in the OH stretching region (3600–3700 cm⁻¹).

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