FTIR analysis of irregularly shaped apatite specimens

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Measurement of specimen thickness is a fundamental parameter in quantitative FTIR analysis, but it becomes increasingly more difficult to measure with smaller and/or irregularly shaped specimens. The infrared spectrum of apatite contains the information needed to address the question of effective, or integrated, specimen thickness. The absorbance of the phosphate combination bands (approximately 1800-2300 cm^{-1}) has been used to measure thickness of (100) sections of apatite [1]. In this study, the absorbance of the phosphate combination bands has been measured for (100), (001) and intermediate crystal sections between 1.0 mm and 20 micrometers thickness.

Data are non-linear, and show the plateau effect expected in absorbance vs. thickness plots for unpolarized spectra [2]. A second-order polynomial is sufficient to describe the data. No differences were observed for varying crystallographic orientations.

Application of this method requires the assumption that the phosphate site has no significant substitutions. This assumption is addressed through later EMPA analysis. The lower limit to this technique is about 20 micrometers thickness, at which point the combination bands disappear.

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REE behaviour in hydrothermal altered rocks from Karkas Mountains, North of Isfahan

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Eocene volcanic rocks, in south western of Karkas Mountain are undergone to hydrothermal alteration. Chemical composition of these rocks is mainly in the range of andesite to trachy-andesite. Hydrothermal alteration process on volcanics, resulted in: propelitic, argillic, advanced argillic and silisic zones. Quartz, kaolinite, sericite, k-feldspar, alunite, natro-alunite, jarosite and pyrite are the main mineral assemblage which is most abundant. Using classic diagram of alunite group indicated that Karkas alunite is in the range of alunite-natroalunite solid solution. Investigation on REE behavior in the alteration system is of special importance. Geochemical experiments results determines REE concentration are various in each altered zone. REE content intensively is depleted in silisific zone. Because increase activity of H^+ and SO_4^{2-} which in turn cause the acid-leaching of primary rock. LREE enrichment distinguished in advanced argillic zone. LREE could substitute K position in the alunite structural formula [1]. REE enriched in argillic zone. With increasing pH, REE could inter in clay minerals and iron oxides structure.

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