Geophysical Research Abstracts
Vol. 19, EGU2017-13934, 2017
EGU General Assembly 2017

Raman spectroscopic study of alunite occurrences in the Sapes porphyry-epithermal deposit, NE Greece

Panagiotis Papazotos (1), Maria Perraki (1), Panagiotis Voudouris (2), and Vasilios Skliros (1)

(1) National Technical University of Athens, Mining & Metallurgical Engineering, Greece (papazotos@metal.ntua.gr), (2) Department of Geology & Geoenvironment, National and Kapodistrian University of Athens, 15784, Zographou, Greece

The Sapes area, Northeastern Greece, represent a deeply eroded Oligocene volcanic edifice built up of post-collisional intermediate-to-acidic intrusives and their volcanic equivalents. The area hosts a telescoped porphyry-epithermal system and associated high-sulfidation epithermal Au-Ag-Cu-Bi-Te mineralization within advanced argillic alteration lithocaps (Voudouris, 2014). Alunite is a common mineralogical constituent among the advanced argillic alteration assemblages and it is a hydrated aluminium potassium sulfate mineral with a general formula $KAl_3(SO_4)_2(OH)_6$.

The objective of this work is to study the alunites samples in the Sapes porphyry-epithermal deposit by means of Raman spectroscopy, as it has been shown to be a useful tool in studying the alunite structure, either natural or synthetic (Frost et al., 2006; Maubec et al., 2012).

Raman spectra were excited employing a 532 nm laser at a resolution of 2 cm^{-1} in the range of 100-4000 cm^{-1}. Raman spectra exhibit distinguished bands at 162 cm^{-1}, attributed to translational mode of cations and or librational and translational modes of SO_4^{2-}, at 235 cm^{-1} suggesting framework deformations including the SO_4^{2-} entities as a whole or attributed to OH/O hydrogen bond stretching mode, a weak band at 385 cm^{-1} may corresponding to Al–OH stretching vibrations, a moderate band at 564 cm^{-1} assigned to Al-O and OH deformation modes, bands at 484 and 653 cm^{-1} respectively due to $v_2(SO_4^{2-})$ and $v_4(SO_4^{2-})$ bending modes, a very strong vibration at 1025 cm^{-1} that is ascribed to the v_1 stretching vibration of the SO_4^{2-} bands located at 1080 and 1186 cm^{-1} due to $v_3(SO_4^{2-})$ stretching modes and finally two bands at 3480 cm^{-1} and 3502 cm^{-1} that are assigned to the OH stretching vibrations (Breitinger et al., 1997; Frost et al., 2006; Maubec et al., 2012 and references therein).

A Raman and FTIR spectroscopic future work will focus on the comparative study among the alunites occurrences in Greece (Sapes, Limnos, Lesvos and Milos), so as to identify the differences and similarities in their structural and chemical features reflecting the geological, geochemical and depositional environment.

References

Breitinger D., Krieglstein R., Bogner A., Schwab R., Pimpl T, Mohr, J., Schukow H. (1997). Vibrational spectra of synthetic minerals of the alunite and crandallite type. Journal of Molecular Structure, 408/409, 287–290

Frost R., Wills R., Weier M., Maertens W., Kloprogge J. (2006). A Raman spectroscopic study of alunites. Journal of Molecular Structure, 785, 123-132.

Maubec N., Lahfid A., Lerouge C., Wille G., Michel K. (2012). Characterization of alunite supergroup minerals by Raman spectroscopy. Spectrochim. Acta A, 96, 925–939.

Voudouris P. (2014). Hydrothermal corundum, topaz, diaspore and alunite supergroup minerals in the advanced argillic alteration lithocap of the Kassiteres-Sapes porphyry-epithermal system, western Thrace, Greece. Neues Jahrbuch für Mineralogie, 191/2, 117-136.