

## **Presence and zoning of hydrous components in leucite from the Alban Hills volcano, Rome, Italy**

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### **ABSTRACT**

This paper reports a single-crystal FTIR spectroscopic study of leucite, a nominally anhydrous mineral (NAM). Several transparent, inclusion-free samples from different occurrences and localities in the Alban Hills volcanic area (Latium, Italy) were analyzed. The FTIR spectra collected in the 4000–3000  $\text{cm}^{-1}$   $\text{H}_2\text{O}$ -stretching region show a broad absorption consisting of overlapping components at 3604, 3500, and 3245  $\text{cm}^{-1}$ . The occurrence of a well-defined combination band at 5225  $\text{cm}^{-1}$  indicates that almost all the examined samples contain hydrous components in the form of structurally bound water molecules. Using the integrated molar absorption coefficient from the working curve of Libowitzky and Rossman (1997), a water content up to >4000 ppm was obtained for the studied specimens. Detailed microspectroscopy mapping shows significant zoning of water in some samples, typically consisting of an anhydrous core mantled by a hydrous rim. The collected data suggest that careful study of the distribution of the volatile content of leucite (and associated volcanic NAMs) may provide a tool to monitor the evolution of the magmatic system where these minerals occur.

**Keywords:** Leucite, Latium, single-crystal FTIR spectroscopy, microchemical composition,  $\text{H}_2\text{O}$  mapping