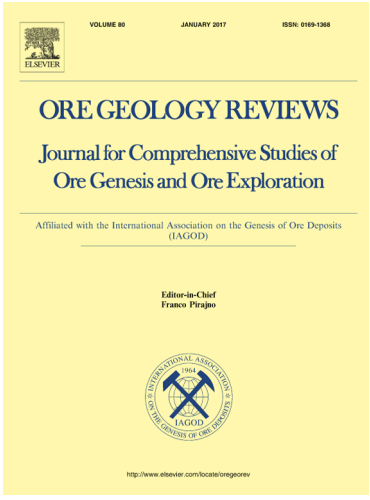


# Major and trace element geochemistry of emerald from several deposits: Implications for genetic models and classification schemes

Carlo Aurisicchio, Aida M. Conte, Laura Medeghini, Luisa Ottolini, Caterina De Vito

PII: S0169-1368(17)30788-6
DOI: https://doi.org/10.1016/j.oregeorev.2018.02.001
Reference: OREGEO 2480

To appear in: *Ore Geology Reviews*

Received Date: 18 October 2017
Revised Date: 26 January 2018
Accepted Date: 1 February 2018

Please cite this article as: C. Aurisicchio, A.M. Conte, L. Medeghini, L. Ottolini, C. De Vito, Major and trace element geochemistry of emerald from several deposits: Implications for genetic models and classification schemes, *Ore Geology Reviews* (2018), doi: https://doi.org/10.1016/j.oregeorev.2018.02.001

# Major and trace element geochemistry of emerald from several deposits: Implications for genetic models and classification schemes

Carlo Aurisicchio[a], Aida M. Conte[a], Laura Medeghini[b], Luisa Ottolini[c], Caterina De Vito[b*]

[1]CNR – Istituto di Geoscienze e Georisorse, Sede Secondaria di Roma, Piazzale A. Moro 5, I–00185 Roma, Italy
[2]Dipartimento di Scienze della Terra, Sapienza Università di Roma, Piazzale A. Moro 5, I–00185 Roma, Italy
[3]CNR – Istituto di Geoscienze e Georisorse, Sede Secondaria di Pavia, Via A. Ferrata 1, I–27100 Pavia, Italy

Corresponding author: Caterina De Vito, caterina.devito@uniroma1.it, +39 06 49914893

## Abstract

In the present work, we report the chemical composition of representative emerald crystals from some of the most important worldwide deposits. Major and trace elements were investigated using Electron Microprobe Analysis (EMPA) and Secondary Ion Mass Spectrometry (SIMS) techniques. Binary, ternary and spider diagrams along with statistical analysis, i.e., Principal Component Analysis (PCA), were used to discriminate each deposit with high reliability. PCA of $SiO_2$, $Al_2O_3$, V, Sc, B, Li content identified distinct groups. The use of binary and ternary diagrams contributed to discriminate among emerald crystals from various deposits, which are included in the same clusters of the PCA analysis. In addition, the geochemical features of each group were linked to the geological environment and genetic processes which leaded to emerald formation. In particular, the emeralds related to granitic-pegmatitic intrusions (Type-1) or those occurring in environments controlled by tectonic events (Type-2) were distinguished using the concentrations of major and trace elements. The results of this study can contribute to improve the existing genetic models and classification schemes as well as to identify useful geochemical fingerprints for provenance purposes.