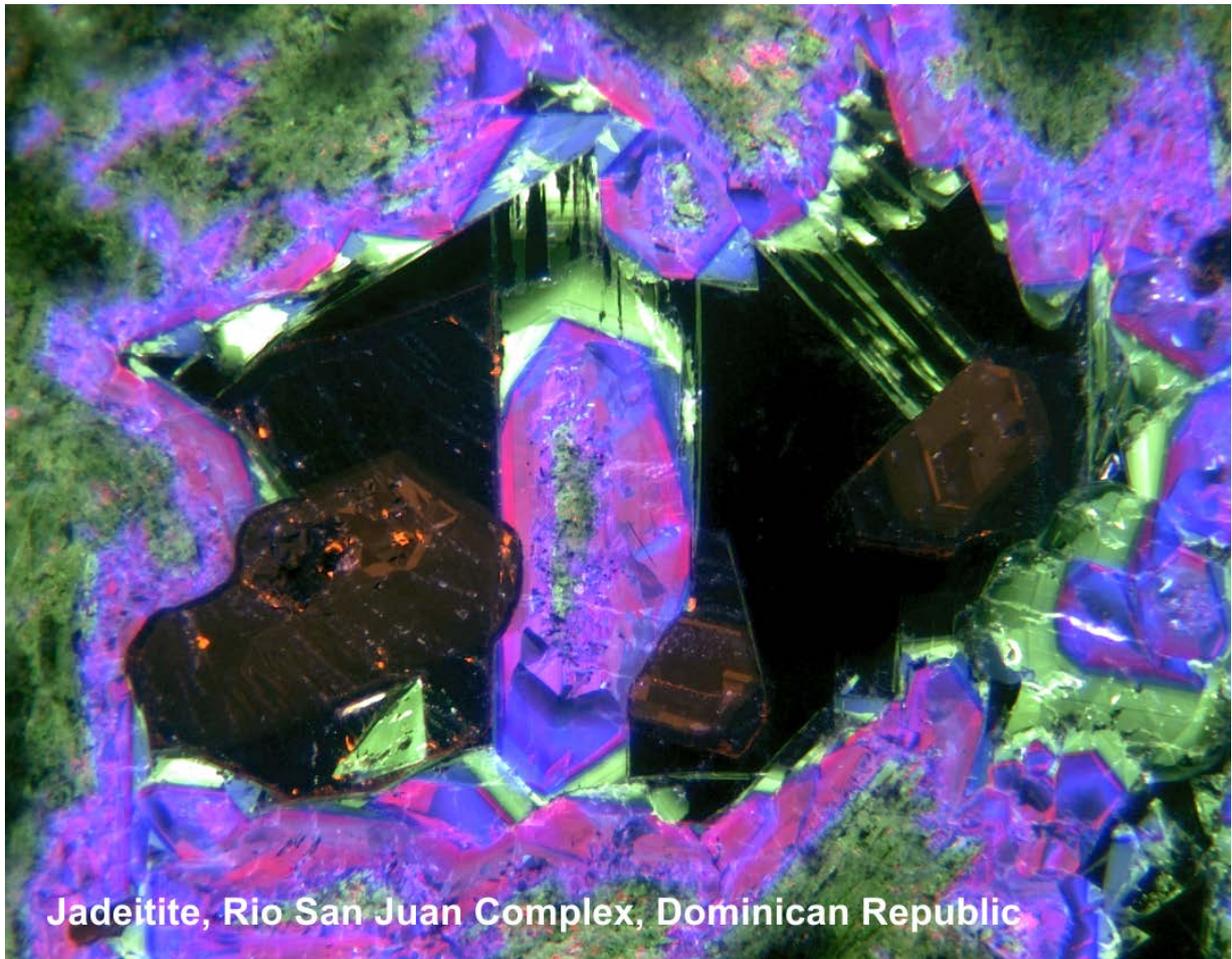


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### **A time machine for rocks: Cathodoluminescence microscopy of metamorphic and magmatic minerals**

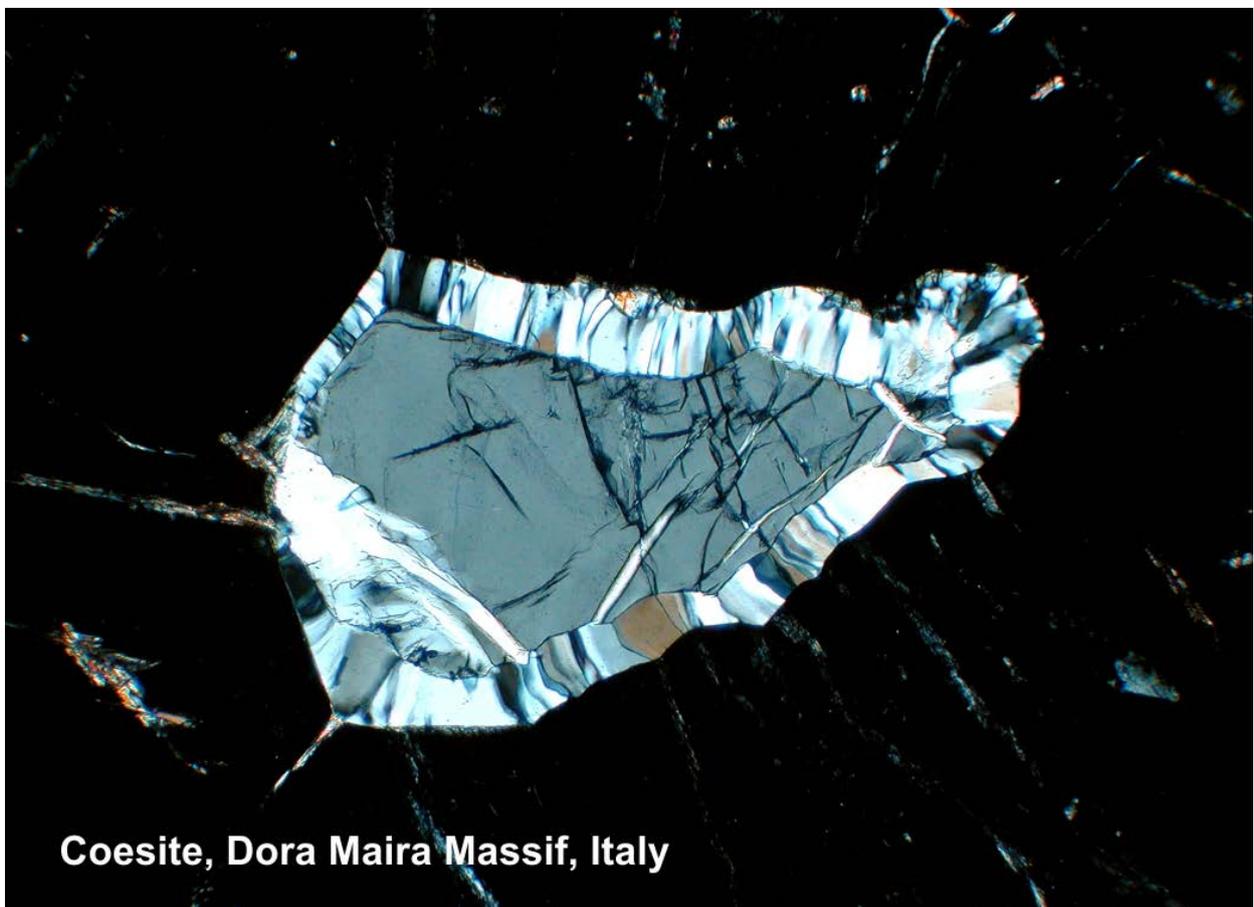
There is hardly anyone who has not dreamed of traveling back in time with a time machine. The cathodoluminescence (CL) microscope is able to uncover and visualize growth structures of metamorphic and magmatic minerals that were generated during their formation. These structures, often not detectable using other imaging methods, open a window into the past and are thus of vital significance for unraveling geological processes. Knowledge of the detailed textural characteristics of rock-forming minerals is of invaluable help, for example in the derivation of more precise and detailed PT-paths or in tracing crystallizing processes in melts, and thus for understanding the evolution of geodynamic processes involving any metamorphic or magmatic rock. This talk focuses on important examples and also documents that CL microscopy of thin sections is an important pathfinder prior to further characterization of minerals by other techniques.



**Jadeite, Rio San Juan Complex, Dominican Republic**

## **How do mountains form? The critical evidence from small-scale petrological observation**

The present surface of the Earth shows the results of rifting, drifting and colliding lithospheric plates. Modern modeling techniques demonstrate how large portions of orogenic belts can be subducted and metamorphosed in the Earth's interior, before making their way back to the surface. However, what is the data base that these pictures of large-scale mountain-forming processes are derived from? Only through a very careful and detailed investigation and interpretation of observations on a sub-millimeter scale is it possible to generate the information necessary to model and understand large-scale orogenic processes. We should bear in mind that many fundamental investigations were only made possible with the use of the polarizing microscope, which remains a fundamental tool in geosciences. This talk highlights the tremendous impact of petrological observations on small scale microscopic features for understanding global geodynamics.



**Coesite, Dora Maira Massif, Italy**