

## **The resilience of accessory minerals**

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A number of U-Th bearing accessory minerals have increasingly become valuable petrogenetic tools for their record of absolute time, trace element and isotopic signatures, temperature, and for their capacity to safeguard mineral inclusions. Investigation of these accessory phases, with or without textural context, has shed lights on countless geological processes including the nature and age of the early crust, the timing and episodic nature of orogenic processes and crustal growth, the duration of melting within the crust, the dynamic of extreme metamorphic settings at high temperature and pressure, and the precise timing and chemistry of volcanic and igneous systems.

The most crucial quality of these accessory minerals is their capacity to record and survive multiple stages of their host-rock evolution. In the investigation of accessory minerals as petrogenetic tools it is thus fundamental to understand the behavior and robustness of these minerals during metamorphism and partial melting of rocks.

This contribution will highlight recent advances in the micro-analysis of accessory phases and review their behavior during crustal processes. Special emphasis will be placed on the solubility of zircon and monazite in melts, robustness of trace element signatures and thermometry at extreme conditions and the recrystallization processes of accessory phases. Case studies showing the decoupling of isotopes and trace elements during metamorphism and the refractory behavior of some accessory phases will be presented.