

*A TEXTURAL AND GEOCHEMICAL GUIDE TO THE IDENTIFICATION OF HYDROTHERMAL MONAZITE:
CRITERIA FOR SELECTION OF SAMPLES FOR DATING EPIGENETIC HYDROTHERMAL ORE DEPOSITS*

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Abstract

Hydrothermal monazite is one of the most reliable geochronometers for U-Pb dating of epigenetic or hydrothermal ore deposits because its blocking temperature, at ca. 700°C, is higher than that of most metamorphic conditions. Although igneous monazite is routinely used for age dating igneous rocks, only a few ore deposits have been dated by hydrothermal monazite. This is due to the similar morphology of hydrothermal and igneous monazite, which prevents the reliable distinction of hydrothermal monazite, in particular.

We demonstrate that hydrothermal monazite can be distinguished from igneous monazite by its unique geochemical signature, its local abundance, and to common association with hydrothermal mineral assemblages. Our data and the data of others reported in the literature suggest that the low ThO₂ content of hydrothermal monazite (0–1 wt %) is distinct from that of igneous monazite (3 to >5 wt %) and may be used to determine their genesis.

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