



Rick Verberne

Work Address: Building 120, Department of Applied Geology, Western Australian School of Mines, Curtin University, Perth, WA 6845, Australia

Phone: 0449922501

Email: rick.verberne@postgrad.curtin.edu.au



Brief Summary

Since the turn of the century rutile has received increased interest in geological studies. Rutile has become an important mineral in provenance studies as it is one of the most stable heavy minerals in the sedimentary cycle and also a widely-spread accessory mineral in a range of metamorphic rocks. Rutile can incorporate a range of trace elements that provide valuable information. The ratio of Cr and Nb provides information on the protolith, as rutile is the major host for these elements. Temperature calculations can be done by applying Zr-in-rutile thermometry. Furthermore, U-Pb dating in rutile has proven to be a robust method for age calculations. As an indicator mineral, the incorporation of W & Sb in the rutile structure can point to ore deposits. Understanding the behaviour of these elements during geological processes is of critical importance for using rutile as a pathfinder mineral. The distribution and mobility of trace elements in rutile is controlled by processes taking place at the atomic scale. This project will address questions about these nanoscale processes. The study will focus on rutile from several regions. For their application as pathfinder mineral, well-characterised, rutile from the Capricorn Orogen, the Barberton Greenstone Belt, and the Ashanti Belt will be studied. Rutile from the Fanad Aureole will provide information on the effect of temperature on element distribution and mass transfer processes. This study makes use of a number of state-of-the-art characterisation technologies, including the relatively new technique, atom probe microscopy, which provides 3D structural, chemical and isotopic data at the atomic scale.

Education: Utrecht University

Research interests: Rutile, Atom Probe Microscopy, Nanoscale characterization

Thesis title: Trace element distribution & mass transfer processes in rutile: Insights from 3D Atom Probe Microscopy

Supervisors: Prof. Steven Reddy, Dr. David Saxey, Dr. Will Rickard, & Dr. Denis Fougereuse

Links

[LinkedIn](#)

[Geoscience Atom Probe Facility \(GAP\)](#)