



Trace element-rich cassiterite ('wood tin') from Central Saxony, Germany

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The mineral cassiterite occasionally occurs as radial-fibrous aggregates that are referred to as 'wood tin' due to their resemblance of the inner structure of wood. Typical material is known from Cornwall (granite-related) and Mexico (associated with rhyolites) but is only of minor economic importance. In the course of heavy mineral-investigations of stream sediments in Central Saxony, the extensive distribution of cassiterite as accessory heavy mineral in the form of 'wood tin' was established. The material was exclusively found as rounded grains (up to 5 mm across) in fluvial sediments.

The obtained wood tin was studied by optical microscopy, cathodoluminescence-microscopy (CL), REM-EDX and bulk geochemistry. Microscopical studies revealed significant structural similarities to wood tin from Taylor Creek (New Mexico, USA), which is referred to the rhyolite-hosted Mexican type of tin deposits. The trace element contents are similar as well. In addition, it was possible to link the currently studied cassiterite with a rhyolite of Upper Carboniferous age (Westphalian C) by geochemical analyses and geological considerations.

Bulk-geochemical analyses of material from the two most important occurrences revealed significant contents in trace elements. The concentrations of Fe and Si reach up to several wt%. Other remarkable trace elements are As (2000-4000 ppm), In (700 ppm), Sb (500-1500 ppm), Y (up to 150 ppm), Zn (700-1500 ppm) and REE (Ce: up to 200 ppm, La: up to 175 ppm). The elements Fe and Si are generally typical for wood tin and can be - at least in parts - assigned to inclusions of hematite and SiO₂-phases (chalcedony?), respectively. The additional presence of diadochically incorporated Fe in the cassiterite lattice is indicated by very weak luminescence phenomena in CL. The high contents of the other elements (e. g., As, In, Zn and REE) suggest the presence of further inclusions.

In microscopical studies of several wood tin samples in reflected and transmitted light, no visible mineral inclusions were observed, whereas numerous cavities (μm -scale) were encountered.

Additional REM-EDX-investigations of polished sections were performed to search for inclusions by the aid of obtained BSE-images. Although no inclusions ($>1 \mu\text{m}$) were found within the cassiterite, it was possible to further refine the interesting micro-structure of the wood tin aggregates. The EDX-spectra confirm significant contents of the trace elements As, Fe, Si and Zn. The micropores and microfissures observed might host extremely finely crystallized minerals or thin encrustations thereof as carriers of trace elements. The identification of these minerals will be an objective of future mineralogical studies.