Trace elements in the tube fossils from silica-hematite rocks of the Urals VMS deposits

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In the Urals VMS deposits, tube worms and bacterial filaments were found near black smoker chimneys and also in hematite-rich ferruginous sedimentary haloes around sulfide mounds. The tube microfossils ~100 μm across and up to 1 mm long consist of the rim made up of fine-disperse hematite and internal channel filled with hematite, hematite-quartz aggregates, leucoxene, rutile, sulfides, apatite, Fe-chlorite, Mn-calcite, REE-carbonates. In comparison to sulfidized vent fauna depleted in trace elements, the hematite-rich tube worms and bacterial filaments contain high contents of biogenic P (up to 1.4 wt %) and V (up to 779 ppm) and also hydrothermal Mn (up to 9393 ppm) and As (up to 1872 ppm), and also high values of Ti (up to 1493 ppm), W (up to 1091 ppm), and U (up to 9 ppm), probably, derived from seafloor altered hyaloclasts. The high As contents are related to oxidation of sulfides. The habitat polluted by highly toxic arsenic is characterized by the presence only of the tube worms and bacterial filaments and display no abundance of other macrofauna. This work was supported by the Russian Science Foundation (project no. 14-17-00691).