Chemical and mass changes of the vein type mineralizations in Çetilli area, (Ordu, Turkey)

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In this study, chemical and mass changes of Çetilli (Ordu) area vein type mineralization at the Eastern Black Sea region are investigated. The geology of the study area consists of volcanic, sedimentary and intrusive rock units. The study area is covered by Upper Cretaceous aged andesite, basalt and their pyroclastic equivalents, trachyandesite and its tuff, volcano-sedimentary sequence and limestone; Paleocene aged limestone, sandstone, claystone, marl, tuff and andesitic dyke; Eocene aged nummulites bearing limestone, andesite, basalt and their pyroclastics, monzonite; Upper Eocene aged basalt and Quvaterner aged travertine. Upper Cretaceous aged andesite, basalt and their pyroclastics are cut by E-W, NE-SW, NW-SE directed many fault systems. The Çetilli Orebody was formed by hydrothermal solutions arising throughout this fractured and cracked zones. Ore minerals are pyrite, sphalerite, chalcopyrite, galena and nabit gold.

Alteration of Çetilli Mineral Deposit display indistinct spatial zonation. Alteration zones are completely controlled by fault systems. Alteration types are observed silicification, calcification, zeolitization, clay, sericitization, limonization, hematization and pyritization. Chloritization and epidotization are observed cut distal part of veins. Alteration minerals are mainly quartz; lesser calcite, dickite, nacrite, ankerite, dolomite, kaolinite and a bit barite. The mass change calculations indicate a 19% volume increase in the ore zones, mainly due to addition of Si (24.45g/100g), Ca (1.06g/100g), K (0.61g/100g) and ore forming elements.

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Iodide in kelp: An inorganic antioxidant in life impacting atmospheric chemistry

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Brown algae of the Laminariales (kelps) are the strongest accumulators of iodine among living organisms. Not surprisingly, this element was discovered in kelp ashes 200 years ago. Kelps represent a major pump in the global biogeochemical cycle of iodine and in particular, the major source of iodocarbons in the coastal atmosphere. Nevertheless, the chemical state and biological significance of accumulated iodine have remained unknown to this date. Elucidation of these questions was the objective of this study. Using an interdisciplinary array of techniques, chiefly relying on synchrotron X-ray absorption spectroscopy, we show that the accumulated form is iodide, which readily scavenges a variety of reactive oxygen species (ROS). We propose here that its biological role is that of an inorganic antioxidant, the first ever to be described in a living system. Upon oxidative stress, a strong iodide efflux occurs. On the thallus surface and in the apoplast, iodide detoxifies both aqueous oxidants and ozone, the latter resulting in the release of high levels of molecular iodine and consequent formation of hygroscopic iodine oxides leading to particles, which are precursors to cloud condensation nuclei.