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Nature and Paragenesis of Copper Mineralization of the Viscaria Property, Kiruna District, Northern Sweden

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The Norrbotten Region in Northern Sweden is recognized by its mining history for Fe-, Cu- and Au-, hosted within Paleoproterozoic-age rocks. Located 5km from the giant Kiruna IOA deposits, the Viscaria deposit was mined for copper in the 1980s. Copper mineralization at Viscaria comprises mantos distributed along several volcano-sedimentary horizons, that host massive to semi-massive magnetite and carbonate with generally disseminated pyrite – pyrrhotite – chalcopyrite – sphalerite.

Evolution of the deposit starts with pervasive and extensive biotite alteration followed by development of magnetite, calcic amphibole, chlorite and talc alteration. Two generations of paragenetically early, disseminated pyrite are replaced by pyrrhotite. Copper sulphide mineralization consists of semi-massive, disseminated and veined chalcopyrite; chalcopyrite is locally replaced by high-Fe sphalerite. Latest alteration comprises carbonate pyrite veins with vuggy textures and pervasive carbonate development.

To help understand the distribution of trace elements within Viscaria, ore and ore-related minerals including amphiboles, have been analyzed for specific trace elements. Preliminary results show that the later generation of pyrite is enriched in Co; pyrrhotite is enriched in Co and Ni. Sphalerite shows slight enrichments in Cd and, locally, in Co. Characterization of trace elements in the ore and alteration minerals along with textural and paragenetic observations will help to understand the evolution of the Viscaria hydrothermal system and its significance for exploration within the Kiruna District.