MINERALOGICAL AND GEOCHEMICAL INVESTIGATION OF THE MN-ORE OF A HISTORICAL MANGANESE DEPOSIT (EPLÉNY) IN HUNGARY

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ABSTRACT

The Early Jurassic Toarcian Oceanic Anoxic Event related manganese mineralization was widespread in Europe. In the 20th century there were two, closely located important mining areas in Hungary, the Úrkút and the Eplény Manganese Deposits. The Eplény mine was closed in 1975. Before and during the mining operation few hundred boreholes were drilled at the location but nowadays the cores are barely available and were not investigated for decades. In this work we focus on archive materials of the Eplény deposit recently recovered from a drill-core storage.

We can divide the Eplény deposit to a Western and an Eastern part. In the Western part siliceous, iron rich primary manganese ore-, while in the Eastern part porous reworked secondary manganese ore can be found. The Western part could be further subdivided into two other groups, where the bigger contains only manganese-oxide ores and the smaller contains Mn-oxide (mainly pyrolusite as described in former publications) and Mn-carbonate (mainly rhodochrosite) ore too.

In the last three years we had the opportunity to archive the old drill cores in the drill-core storage of the Úrkút mine and almost 200 samples covering all the different parts of the Eplény mining area for detailed investigation were selected: stereo- and polarized reflected light microscopy, X-ray microanalysis (EMPA), mass spectrometry (ICP-MS), X-ray fluorescence spectroscopy (XRF), optical emission spectroscopy (ICP-OES), X-ray powder diffraction (XRD), Raman spectroscopy and micro x-ray diffraction (μXRD).

During our work we determined the main ore minerals (pyrolusite, todorokite, cryptomelane, hollandite, rhodochrosite, kutnohorite and lithiophorite) and gangue minerals (quartz, calcite, feldspars, pyrite, gypsum, clay minerals). The dispersion of these minerals are unequal in the deposit and with additional measurements the formation environment can be specified. In the manganese-carbonate containing part of the deposit changes were detected in the redox condition upwards from the bottom of the Úrkút Manganese Formation. The total rare earth element (REE) content is less than 100 ppm in many cases but positive europium and cerium anomaly was detected in some samples compared with the composition of the upper continental crust.

With the help of our work a more detailed picture can be drawn about the mineralogical, geochemical and petrological conditions of this historical deposit which is abandoned long ago.

Keywords: *Eplény, Úrkút, manganese ores, manganese mineralogy*