SEPARATION OF THE 10 Å GREEN CLAY MINERAL FROM THE CARBONATIC MANGANESE ORE, ÚRKÚT, HUNGARY

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The green clay mineral(s), referred in the geological literature mainly as glauconite, of the banded carbonatic manganese ore in Úrkút, Hungary was studied by several authors. A comprehensive list of results is given by POLGÁRI (1993). In spite of the intensive studies in the past there is no consensus concerning the nature of the mineral. The main reason of that uncertainty is that the very fine grains of the mineral are always to be found in intimate mixture with other very fine grained phases, like rhodochrosite (RH), quartz (Q) and goethite (G). In all of the previous studies, part of these phases were omitted only by recalculation of data measured on mixtures, in other words there has been no full mineralogical data set measured on the pure green clay phase.

The aim of this study was to design a separation procedure applicable for the given mineral assemblage and the preliminary characterisation of the separated pure green mineral phase (and, as a by-product, the chemical characterisation of the other phases).

We investigated the reference samples studied in details by a team of Prof. Gyula Grasselly (GR) during the 1980s (for the list of these research reports see POLGÁRI (1993)). When selecting samples we took the earlier analyses into consideration for finding samples containing the less interstratified 10 Å phyllosilicate(s) (CM10A) and being available in appropriate quantity for further studies. Having tested several samples and having observed all the four expected phases (CM10A, RH, Q, G) by XPD and IR we selected two samples from the bottom of the "Main Ore Bed": MV1 (= #188a of GR = the green part of the #3 of GR) and MV2 (= #4a of GR = the green part of the #4 of GR), and one from the top of the same bed MV3 (URK-6 of Polgári = # 49 of GR).

The separation procedure consisted of three steps. In the first two RH and G were removed by traditional chemical separation. In the third step, Q was separated from CM10A by applying a new mechanical separation method. In the case of the carbonate removal both diluted hydrochloric and acetic acids were used in parallel control separations. In the third step we used the water soluble carboxymethylcellulose-Na salt (CMC) for preparing a separation medium. We found that a 2 % CMC solution was of viscosity high enough to be applicable for the separation of CM10A and Q (based on density and shape) in an ultracentrifuge. All steps of the separation were monitored by XPD and ICP measurements, reference materials from all steps were kept for control.

Detailed study of the separated phases available now will help the more exact reconstruction of the Toarcian anoxic basin in Úrkút. This work was supported by OTKA Grant # T25873.

Reference

POLGÁRI, M. (1993). Manganese Geochemistry – Reflected by Black Shale Formation and Diagenetic Processes. Hungarian Geological Institute, Budapest pp. 107–211.