SYNCHYSITE-(Ce) FROM THE KOMLÓ COAL DEPOSIT, MECSEK MTS., SOUTH HUNGARY

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A REE-bearing mineral, synchysite-(Ce), was identified from the Komló coal deposit, Mecsek Mts. Its appearance was probably influenced by the surrounding phonolite area.

Some REE (such as lanthanum, yttrium) were earlier identified by complex trace element studies in the coal deposit (CSALAGOVITS & VIGHNÉ FEJES, 1969), but REE-bearing minerals have not been found. In the close geological environment of the coal deposit (partly in the coal seams too), submarine volcanic/subvolcanic alkaline rocks, especially phonolite occur in some outcrops. Electron microprobe analyses proved the presence of some accessory REE minerals like britholite, bastnäsite, nacareniobsite and joaquinite in the phonolite (PANTÓ, 1980; NAGY, 2003; SZAKÁLL, unpublished).

A mineral-rich paragenesis was identified in the septarian fissures of pelosideritic concretions at Zobák shaft, Komló in the last few years. The main fissure fillings are: quartz, calcite, siderite, pyrite, marcasite and kaolinite. The rare accessory minerals are: barite, galena, sphalerite, millerite, etc.

The synchysite-(Ce) was shown as pale rose, prismatic crystals (up to 1.5 mm) in close association with quartz and calcite. The crystals always have pseudohexagonal habits. The prism is always strongly striated because of its oscillating development.

The synchysite at Komló proved to be rich in cerium and neodymium by electron microprobe analyses. The result of EPMA (average of five analyses in weight %): CaO 16.80, Y_2O_3 0.26, La_2O_3 4.21, Ce_2O_3 18.82, Pr_2O_3 3.67, Nd_2O_3 18.95, Sm_2O_3 2.79, Eu_2O_3 0.37, Gd_2O_3 0.96, Tb_2O_3 0.00, Dy_2O_3 0.01, Ho_2O_3 0.01, Er_2O_3 0.00, F 3.24, Σ 70.08. The minerals in the synchysite-subgroup of bastnäsite-synchysite-parisite group are distinguished according to the dominant REE as synchysite-(Ce), synchysite-(Nd) and synchysite-(Y) (FLEISCHER, 1978). Considering the EPMA, the Komló synchysite can be identified as synchysite-(Ce) because the Ce and Nd content are very similar, but the ionic number is Ce = 1.85; Nd = 1.74.

The chemical formula, which was calculated from EPMA is as follows: $Ca(Ce_{0.38}Nd_{0.37}La_{0.08}Pr_{0.07}Sm_{0.05}Ga_{0.02}Eu_{0.01})(CO_3)_2F_{0.57}$.

The X-ray diffraction data support the results of the chemical analyses, the d values show good correlation with the bibliographic data of synchysite-(Ce), but the intensity of the reflections are different, assumable due to the high Nd-content. The most important d values are the following (the data of JCPDS 18-284 file are in the brackets): 9.07 (9.1), 4.54 (4.53), 3.54 (3.55), 2.79 (2.80), 2.04 (2.06), 1.91 (1.87). Unit cell data are: a = 7.082 Å, c = 54.565 Å. It shows transitional values between synchysite-(Ce) (a = 7.126 Å, c = 55.08 Å; ICDD PDF2 # 44-1438) and synchysite-(Nd) (a = 6.984 Å, c = 54.27 Å; ICDD PDF2 # 35-0589). The Ca : REE ratio is near 1 : 1 (4.7822 : 4.8118), this is also an evidence for synchysite. TEM study, however, signed some inhomogenities in the synchysite; in these places both parisite and röntgenite may appear.

The appearance of synchysite-(Ce) can be in connection with the REE-enrichment of the magmatic environment. The REE was mobilized by post-magmatic processes, together with other elements. The close paragenesis of synchysite-(Ce) demonstrate definitely hydrothermal conditions.

Investigated synchysite-(Ce) sample from Komló is preserved in the mineral collection of Herman Ottó Museum (Miskolc, Hungary) under catalogue number 18590.

References

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