Joint
5th Central-European Mineralogical Conference
and
7th Mineral Sciences in the Carpathians Conference

Book of abstracts

Banská Štiavnica
June 26 – 30, 2018

Comenius University in Bratislava
Mineralogical Society of Slovakia (SMS) and Slovak Mining Museum (SBM)

Joint 5th Central-European Mineralogical Conference and 7th Mineral Sciences in the Carpathians Conference

Book of Abstracts

Scientific Board:
Igor Broska (Slovak Academy of Science, Bratislava), Andreas Ertl (University of Vienna), Shah Wali Faryad (Charles University, Prague), Jozef Labuda (Slovak Mining Museum, Banská Štiavnica), Milan Novák (Masaryk University, Brno), Marian Putiš (Comenius University, Bratislava), Adam Pieczka (AGH University of Science and Technology, Kraków), Ján Spišiak (Matej Bel University, Banská Bystrica), Csaba Szabó (Eötvös Loránd University, Budapest), Sándor Szakáll (University of Miskolc)

Organizers:
Peter Bačík (Comenius University, Bratislava), Pavel Uher (Comenius University, Bratislava), Jana Fridrichová (Comenius University, Bratislava), Martin Ondrejka (Comenius University, Bratislava), Peter Koděra (Comenius University, Bratislava) Martin Macharík (stiavnica.sk), Tomáš Mikuš (Slovak Academy of Science, Banská Bystrica), Martin Števko (UK Mining Ventures Ltd., East Coker), Jan Cempírek (Masaryk University, Brno)
Joint 5th Central-European Mineralogical Conference and 7th Mineral Sciences in the Carpathians Conference

Editors: Martin Ondrejka Jan Cempírek and Peter Bačík

The manuscripts have been reviewed by: Khaled Abdelfadil, Peter Bačík, Igor Broska, Jan Cempírek, Andreas Ertl, Štefan Ferenc, Radek Hanus, Monika Huraiová, Marian Janák, Stanislav Jeleň, Ján Kráľ, Otilia Lintnerová, Zděnek Losos, Juraj Majzlan, Milan Novák, Martin Ondrejka, Daniel Ozdín, Igor Petrík, Jaroslav Pršek, Reně Putiška, Jiří Sejkora, Radek Škoda, Martin Števko, Pavel Uher, Peter Uhlík, Anna Vozárová

The English was not reviewed

Published by: Comenius University in Bratislava

Printed in: Comenius University in Bratislava

Authigenic vivianite in glacial sediments of Batizovské pleso, Tatra Mts., Slovakia

1Stanislava Milovská, 1Adrián Biroň, 1Radovan Pipík, 1Juraj Šurka, 2Dušan Starek, 3Peter Uhlík, 1Tomáš Mikuš, 1Jana Rigová, 1Lucia Žatková and 1Marina Vidhya

1 Earth Sciences Institute of the Slovak Academy of Sciences, Ďumbierska 1, Banská Bystrica, Slovakia
2 milovska@savbb.sk
3 Earth Sciences Institute of the Slovak Academy of Sciences, Dúbravská cesta 9, Bratislava, Slovakia
3 Comenius University, Faculty of Natural Sciences, Department of Economic Geology, Ilkovičova 6, Mlynská dolina, 84215, Bratislava, Slovakia

Key words: phosphate, vivianite, lake sediments, deglaciation, High Tatra Mts.

The Batizovské pleso is a glacial mountain lake, located in Batizovská dolina (Tatra Mts.) at an altitude 1884 m a.s.l., with surface area of 3 ha. Lake is dammed by granitoid bedrock, recharged by underground flow through blocky moraines and discharged by one surface stream. Two sediment cores were taken by percussion corer in 2016.

Microchemical scanning by X-ray fluorescence (XRF) revealed distinct phosphate enrichment in some laminae, rare dark blue drusy aggregates of vivianite Fe\(^{2+}\)(PO\(_4\))\(_2\)•8H\(_2\)O are bound to these layers, of size up to 18 mm. Vivianite concretions are buried in the depth of 315 cm within finely laminated, organic-poor sequence presumably deposited in periglacial conditions. Sediment is composed of quartz, plagioclase, K-feldspar, muscovite, illite/smectite, chlorite, kaolinite and biotite, grain-size fraction <0.06 mm dominates. Alternating dark- and light grey laminae have thickness ca. 0.5 – 2 mm, dark laminae are enriched in iron and fine grained organic matter.

Vivianite was identified by means of XRPD analysis and Raman spectroscopy. Its structure was described using Pawley refinement. A monoclinic cell with \(a = 10.009(12), b = 13.416(7), c = 4.706(5)\) Å, \(\beta = 102.53(5)\) ° and space group \(I2/m\) could be used to fit its structure. The basic features in Raman spectra correspond to vivianite, with lattice modes below 360 cm\(^{-1}\), internal modes at 454, 540, 835, 950, 1054 cm\(^{-1}\), and vibrations of molecular water at frequencies 3100 – 3500 cm\(^{-1}\). The structure of vivianite partially degrades under oxidative conditions, resulting in decay of spectra. XRF analyses show enrichment in Mn.

Vivianite nodules form postdepositionally in lake sediments, when Fe\(_{III}\) oxyhydroxides dissolve under reducing conditions in absence of sulfur. Released Fe\(_{II}\) and sorbed P reprecipitates in form of Fe\(_{II}\) phosphates. Source of phosphorus is an open question – organic-bound phosphorus or weathering of accessory phosphates in granitoids come under consideration.

Acknowledgment: This work was supported by the project APVV-15-0292.