universität wien

Fakultät für Geowissenschaften, Geographie und Astronomie

Institut für Mineralogie und Kristallographie
Univ.-Prof. Dr. Ronald Miletich-Pawliczek
Althanstraße 14 (UZA II)
A-1090 Wien

T +43 (1) 4277-532 65
F +43 (1) 4277-95 32
ronald.miletich-pawliczek@univie.ac.at
http://www.univie.ac.at/mineralogie/

St.Peterburg State University

To whom it may concern

Wien, am 07. November 2013

Assessment on the PhD thesis submitted by Elena S. Zhitova (Dept. of Crystallography, SPbSU)

The submitted thesis with the title Crystal Chemistry of Natural Layered Double Hydroxides represents a doctoral dissertation in cumulative form, thematically compiled of in total five related scientific articles. The main focus of the overall objective is the structural crystallography related to polytypism and the complex structural variations of the representative mineral phase quintinite, in the general context to the potential storage capacities of natural double layer hydroxides.

Objective of the experimental study are natural samples from two different localities in Russia. Analytical investigations encompass microprobe analyses, vibrational spectroscopy, and extensive investigations by means of X-ray diffraction methods. In particular single-crystal investigations play a central role of this work, which aims at the reconstruction and interpretation of reciprocal-space informations and subsequent refinement of structural models with respect to possible superstructures and polytypic variations. The results of these experimental investigations comprise a clear demarcation from manasseite and hydrotalcite structure, which represent different polytypic variations due to stoichiometric variations related to the Mg,Al site distribution and related cation order. One of the bottom lines of findings within the sope of the presented work is the relationship between the formation of polytypes and related ordering schemes can be assigned to different crystal growth conditions as expressed by cation order/disorder and symmetry aspects within this family of closely related structures.

Three of the individual scientific articles (PI, PII; PIII) are published in the internationally recognized journal Mineralogical Magazine (impact factor 2.212 in 2012), article PIV (in Russian) is published in the Bulletine of the Saint-Petersburg State University, and article PV represents a chapter in the Book Minerals as Advanced Materials (Springer-Verlag, edited by S.V. Krivovichev). All articles are published between 2010 and 2012, and the candidate has taken over the role as first author in article PIII, which includes writing of the article. As a side note, the contribution of the candidate is revealed for each publication, and states the leading role for sampling and carrying out the individual measurements, in addition to major contributions in the data analyses and drafting the articles. As within the process of submission of articles to scientific journals the contributions were underlying the process of critical reviews, a detailed evaluation has already been carried out on this occasion. Surveying under the same aspect the accepted articles, there is no additional comment necessary, and the articles represent pieces of solid scientific work based on careful experimental studies. This is also expressed by the additional lead paragraphs shortly describing background and motivation, objectives and methods, and the main results. These lead paragraphs are written in concise form, outline the main points and provide references to the existing literature.

Summarizing it can be assessed that the submitted thesis represents high-rank research activities, from scientific point of view both the articles and the thesis undoubtedly confirm the qualification of the candidate of having fulfilled the requirements for obtaining a PhD degree, which compares to international standards. Therefore I finally want to express my unrestricted recommendation to the responsible advisory board to continue and complete the ongoing process.

Ronald Miletich-Pawliczek