FACULTY
OF SCIENCE

AGH University of Science and Technology

30-059 Kraków, Mickiewicza 30, Poland

THE PhD DEGREE REVIEW

Mineralogical study of phosphate-bearing pegmatite from Lutomia

ADAM WŁODEK

Brief summary of the thesis: Mineralogical study of the geochemically primitive, moderately fractionated, LCT, phosphate-bearing pegmatite from Lutomia in the Góry Sowie Block, SW Poland, is presented. It includes a comprehensive overview of the geology of the the Góry Sowie Block where the examined pegmatite is located as well as related pegmatites Michałkowa and Piława Górna. Electron probe microanalysis is a principal method along with Raman spectroscopy. All relevant pegmatitic minerals were discussed in detail regarding their chemical composition, showing evolution within pegmatite from borders to central parts. Phosphates evolving from primary magmatic via secondary, metasomatic assemblage to a secondary, hydrothermal and weathering assemblages were examined in particular. Possible origin of the pegmatite melt was discussed as well.

Strengths of the thesis: Complex approach to the study including analytical methods and examined objects in the Lutomia pegmatites from macro- to microscopic scale. Evident ability of the candidate to deal with the used analytical methods including discussion of the results. Some comments are given in the attachments.

Weaknesses of the thesis: I do not see any fundamental only minor but mostly formal were found (see the attachments).

Conclusions:

Disregarding my comments given in the attachments No. 1 and 2 I am sure that this PhD thesis fulfills the qualities requested for the PhD title and I recommend the thesis to be accepted at your university.

Brno, September 15th 2020

Sincerely yours

Milan Novák

Professor of Mineralogy,

Masaryk University, Brno

THE PhD DEGREE REVIEW
ADAM WŁODEK
Part 2

Attachment 1 Formal comments

It contains my formal recommendations which would make the thesis more convenient for the readers, especially if they are not familiar with the region. It means to add new or corrected figures and tables instead of written text in most cases.

Page 22 I recommend to add simple geological map with the relevant pegmatite localities to show how they are distributed and relations to the principal geological units (subunits).

Pages 25, 45 Idealized cross section through pegmatite body would show much better relations of the individual pegmatite units (subunits).

Page 38 Why figures (photos, drawings) showing the textures were not used?

Page 44 Calculation of tourmaline formula is missing.

Page 45 Simple table with minerals relevant to the individual zones (units) would help.

Page 54 Why are some tables given in 2 pages? Just use a smaller font or shift the table.

Page 98 Simple table would demonstrate better what is written in the text.

Page 171 Incorrect formula of löllingite.

Page 179 Ternary diagram for tourmaline compositions Fig. 77 is not the best. It is better to use widely used diagrams, in this case Al_{tot} – Mg – Fe although the difference is small.

Attachment 2 Factual comments

This part also may serve as the questions of the reviewer, in **bold** are important.

Page 61,62 Fluorine in tourmaline was not analyzed or is it below the detection limit?

Page 191 Why spider diagram normalized on chondrite usually used for REE minerals is not present along with ternary diagram showing only Ce-La-Nd phosphates? It may also show some evolution.

Principal comments:

The thesis are evidently focused on the phosphate mineralization and its evolution from primary magmatic to low-T hydrothermal stages in the granitic pegmatite.

a) Why diagrams showing alteration sequences of phosphate minerals published e.g., by Roda-Robles et al. (2012), Baijot et al. (2012), Vignola et al. (2018) for similar phosphate pegmatite localities were not created and discussed?

b) Only comparisons with the Michałkowa pegmatite and Pilawa pegmatite system were given. Why other similar localities of granitic pegmatite with phosphate mineralizations (see above) were not discussed? They will tell us much more than tables (e.g., Table 22 whiteite) with the occurrences of the individual mineral species.

References

Roda-Robles, E., Galliski, M. A., Roquet, M. B., Hatert, F., & de Paeseval, P. (2012). Phosphate nodules containing two distinct assemblages in the Cema granitic pegmatite, San Luis province, Argentina: Paragenesis, composition and significance. *The Canadian Mineralogist*, *50*(4), 913-931.

Baijot, M., Hatert, F., & Philippo, S. (2012). Mineralogy and geochemistry of phosphates and silicates in the Sapucaia pegmatite, Minas Gerais, Brazil: Genetic implications. *The Canadian Mineralogist*, *50*(6), 1531-1554.

Vignola, P., Zucali, M., Rotiroti, N., Marotta, G., Risplendente, A., Pavese, A., ... & Bertoldi, G. (2018). The Chrysoberyl-and Phosphate-Bearing Albite Pegmatite of Malga Garbella, Val Di Rabbi, Trento Province, Italy. *The Canadian Mineralogist*, *56*(4), 411-424.

Brno, September 15th 2020

Milan Novák