The project is aimed at description of a few new and some associated rare minerals found in a lithium-cesium-tantalum (LCT) rare-element granitic pegmatite from the Szklary serpentine massif in Lower Silesia, Poland. The pegmatite revealed the presence of numerous rare and unknown mineral phases (Pieczka 2000, 2007a, 2010), from which only three: nioboholtite (IMA2012-78), titanoholtite (IMA2012-79) and szklaryite (IMA2012-070) were completely described and approved by the Commission on New Minerals, Nomenclature and Classification of the International Mineralogical Association (IMA CNMNC) (Pieczka et al. 2013a). The approval resulted in an additional recommendation of a new classification of the dumoriterite-supergroup minerals voted positively by the IMA CNMNC (Pieczka 2013b). Due to these reasons, the Szklary pegmatite became one of the most famous Polish mineralogical localities.
Previous, and also recent mineralogical investigations revealed the presence in the pegmatite of a few mineral assemblages unique on the world scale, namely:
(1) numerous Mn/Fe–(As/Sb)–Nb/Ta oxides along with very diversified products of their alteration, representing the pyrochlore-supergroup minerals enriched in Sb, Bi or U;
(2) exotic Al-bearing minerals (chrysoberyl, dumortierite-supergroup minerals: dumortierite–holtite–nioboholtite–szklaryite, as well as secondary Al phosphates and arsenates), which document desilification and Al enrichment processes in the parental residual magma due to its intrusion into the ultrabasic and basic host;
(3) a very unique assemblage of Mn-bearing phosphates, among others, with beusite and various apatite-group members that reveal the highest worldwide enrichment in Mn;
(4) very exotic, only recently recognized Li-bearing minerals (lithiophylite and probably two unknown to date Li-micas);
(5) a group of rare, secondary Mn oxides enriched in Ba, Pb, Bi, Ni and Mg;
(6) native elements and their alloys (As, Sb, Bi, Au, stibarsen and paradocrasite).

The most interesting phases, representing potentially new minerals comprise:
• three Mn-enriched members of the apatite group with compositions $Mn_2Ca_3(PO_4)_3F$, $Mn_2Ca_3(PO_4)_3OH$ and $Mn_2Ca_3(PO_4)_3Cl$,
• extremely Bi-enriched members of the pyrochlore supergroup, representing the pyrochlore-, microlite- and betafite-group members with possible oxy-, hydroxy-, keno- or hydro- varieties,
• dickinsonite-(BaNa) and dickinsonite-(PbNa),
• a Ta-Ti oxide with very exotic composition $Mn_3UAs_2Sb_2Ti_2Ta_2O_{20}$,
• a new mica-group mineral $Ba(AlLi_2)AlSi_3O_{10}(OH,F)_2$,
• a trilitionite-like mica with OH >> F,
• $NaMn_4(PO_4)_3$,
• $MnAs_2O_4$,
• and other phases possible to discover during the project realization.

Data on compositions and mode of occurrence of the mentioned new phases, supplemented with an information on the other rare minerals (other pyrochlore-supergroup minerals and the unique phosphate assemblage and Li-bearing minerals), and also on the main mineral components of the pegmatite (feldspars, micas and tourmalines) bearing coded geochemical information on fractionation scale of rare elements in the parental pegmatite-forming melt, would give possibility of complete geological description of that unique body.

Realization of the proposal would require limited field works and complex laboratory investigations, including electron-microprobe spot chemical analyses (EMPA), powder X-ray diffraction (PXRD), X-ray single-crystal structure refinement (SREF) [optionally electron-back scattered diffraction (EBSD) or transmission electron microscopy (TEM) diffraction], infra-red (IR) and Raman spectroscopic (RS) studies as well as basic observations under optical microscopy and under scanning electron microscopy (SEM). All the methods are constrained by data necessary for the IMA CNMNC check-list preparation. The studies will be partly realized in the parental university of the Principal Investigator, AGH UST (EMPA, PXRD, IR, RS, SEM) as well as in collaboration with other scientific units: Inter-Institute Analytical Complex for Minerals and Synthetic Substances at the Faculty of Geology, University of Warsaw (EMPA), Department of Crystallography at the Faculty of Chemistry, Jagiellonian University, or Institute of Material Sciences, University of Silesia (SREF), or optionally in collaboration with some famous, foreign crystallographers and mineralogists dealing with structural studies of minerals. In situ microanalysis of trace elements in feldspars and micas will be carried out by means of ion microprobe or laser ablation LA-ICP-MS techniques in one of few possible foreign scientific units.

The recognition of new minerals is always fundamental achievement not only in the Earth sciences (mineralogy, geology), but also in solid chemistry, solid physics, crystallography and material sciences, very often deriving from an initial mineralogical information. Due to the unique character of the pegmatite expressed in the presence of very diversified mineral assemblages and high geochemical fractionation of some rare elements, the results would also allow to broaden the general knowledge on pegmatite mineralogy as well as the genesis and processes governing the evolution of desilified, LCT melts. Additionally, a beneficial impact should be observed in increasing international rank of the Polish mineralogy, not only by increasing number of discovered new mineral species coming from Poland, but also by the international discussion (publications in international mineralogical WoS journals), increasing the knowledge of mineral-forming processes and promoting the team of the project investigators. Thus, the project might be a good example of scientific exploration of a unique mineralogical object in Poland by a national team of mineralogists, collaborating with foreign crystallographers and mineralogists, adding to the development of mineralogy in Poland and mineralogical sciences at all. The obtained results on new minerals should be relatively easily published in the WoS list journals, similarly like syntheses on pegmatite topics, due to the unique mineralogical character of the pegmatite (high degrees of rare element fractionation and desilification and Al enrichment processes of the parental, pegmatite-forming melt).

Complete excavation of the pegmatite and removal of the vast majority of scientific-valuable material by collectors at the turn of 2002/2003 is one of the most important facts, which should additionally favour, even require undertaking of advanced studies on new and rare minerals in the Szklary pegmatite (the removed material has never appeared at any national mineral exhibition). Prospection for the pegmatite continuation before the PEG ’2015 conference showed that the pegmatite was excavated completely. In such a way, samples of the Szklary pegmatite collected in the past by the Principal Investigator and other co-investigators in the project proposal are the only material, which still gives an opportunity to complete the knowledge on mineralogy, evolution and origin of the unique pegmatite body from the Szklary serpentinite massif.