PhD Advisor form

Name of the advisor: Maria Gazda

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Discipline[i] materials engineering

Bibliometric indicators

1.	Number of journal publications in WoS/ Scopus	156/157
2.	Citations (WoS/Scopus) excluding self-citations	1480/1611
3.	Hirsch index (WoS/Scopus)	19/21
4.	Hirsch index in Google Scholar	24
5.	Citations in Google Scholar	2278

1. The number of PhD students who have graduated under your supervision: 3
2. The number of PhD students currently supervised: 3
3. Are you currently accepting new PhD students:
   a. Polish Yes
   b. Foreign Yes

Research interests or topics offered for PhD research (no more than 2000 characters)[ii]

Studies will concern properties of proton conducting perovskite oxides based on acceptor-doped barium zirconate, cerate or their solid solutions and the influence of strain on their properties. In most oxide proton conductors the mechanism of the proton transport is the two-step mechanism, which consists of a rotation of the protonic defect and proton transfer to a neighbouring oxygen ion. High proton conductivity requires high concentration and mobility of protonic defects. The proton concentration depends mainly on the concentration of acceptor dopants and hydration energy. These may also be affected by strain since it influences dopant solubility, oxygen vacancy concentration and hydration energetics. High proton mobility is promoted by short proton hopping distance, low lattice distortion related to the proton hopping, low repulsion between protons and cations in transition state configuration and high symmetry of the lattice. The strain may influence the material properties through changes of the distances between ions in the solid. The influence of strain on the mobility is not straightforward, since not only sign but also type of strain is important. In cubic crystals, and proton conducting perovskites crystallize in either cubic or close to cubic structures, only the hydrostatic strain does not break crystal symmetry, whereas other types of strain reduce symmetry. So, the hydrostatic strain influences the unit cell volume, that is, the distance between neighbouring oxygen ion between which proton hopping occurs. It may be expected that proton mobility should increase with decreasing hopping distance. On the other hand, reduction of the crystal symmetry leads to the non-equivalency of the sites between which protons hop, decreasing in this way the proton mobility.

What is important, this topic is worth studying. So far, there have been only a few reports concerning strain influence on proton conductors published.

PhD Advisor form

Funding or special equipment needed to carry out a PhD project [iii]:

1. Is funding available for experimental work: Yes
2. Is the equipment needed to complete a PhD project available in your lab/department: Yes

Most recent publications in WoS/SCOPUS journal – no more than 5 published after 1.01.2017

No	Authors/title/journal	Journal IF/Quartile – for WoS and SNIP/ CiteScore for SCOPUS	Publication year
1.	K. Dzierzgowski, S. Wachowski, M. Gazda, A. Mielewczyk-Gryń, Terbium Substituted Lanthanum Orthoniobate: Electrical and Structural Properties, Crystals 2019, 9, 91	2.144/Q2 0.745/1.97	2019
2.	P. Winiarz, A. Mielewczyk-Gryń, S. Wachowski, P. Jasinski, A. Witkowska, M. Gazda, Structural and electrical properties of titanium-doped yttrium niobate, Journal of Alloys and Compounds 767 (2018) 1186-1195	3.779/Q1 1.403 3.66	2018
3.	S. Wachowski, B. Kamecki, P. Winiarz, K. Dzierzgowski, A. Mielewczyk-Gryń and M. Gazda, Tailoring structural properties of lanthanum orthoniobates through an isovalent substitution on the Nb-site, Inorg. Chem. Front. 2018, 5, 2157-2166	5.106/Q1 0.91/4.98	2018
4.	K. Dzierzgowski, S. Wachowski, W. Gojtowska, I. Lewandowska, P. Jasiñski, M. Gazda, Al. Mielewczyk-Gryñ, Praseodymium substituted lanthanum orthoniobate: Electrical and structural properties, Ceramics International 44 (2018) 8210–8215	3.057/Q1 1.167/2.85	2018
5.	Zagórski K., Wachowski S., Szymczewska D., Mielewczyk-Gryń A., Jasiński P., Gazda M, Performance of a single layer fuel cell based on a mixed proton-electron conducting composite, JOURNAL OF POWER SOURCES. -Vol. 353, (2017), s.230-236	6.945/Q1 1.536/7.0	2017

Most recent externally funded projects you were involved in – no more than 3

No	Project title, the name of the Princ. Investigator (PI) and the institution the project was carried out	Year awarded	Role in the project
1.	Strain engineering of proton conducting oxides, PI - Maria Gazda and Giedrius Laukaitis, NCN	2017	co-PI
2.	Triple conducting oxides, PI - Maria Gazda, NCN	2016	PI

3.	Governing Principles in Hydration of Mixed Conducting Oxides, PI of Polish part- A. Mielewczyk Gryń, NCN	2016	R

Additional relevant information – (no more than 1600 charters)[iv]

1) The thesis of one of the PhD students was granted with honors (S. Wachowski);

2) In the group of 3 PhD students currently under my supervision:

1 student has just completed the thesis and will finish the studies before schedule (P. Winiarz),
1 student has already finished the experimental work and starts writing (K. Dzierzgowski),
1 student will, most probably, complete the procedure under the supervision of dr A. Mielewczyk-Gryń who is going to start the habilitation procedure in April 2019 (I. Lewandowska).

[i] You may select up to two disciplines out of 12 disciplines represented in the Doctoral School
[ii] Observe the limit of not more than 300 words
[iii] Leave only one answer
[iv] Add any other relevant information eg. awards for PHD students whom you supervised (no more than 200 words)