Prospective supervisor's form

Name of the supervisor: Donata Konopacka-Lyskawa

Academic title: Ph.D., D. Sc., Eng.

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Faculty of Chemistry

Gdańsk University of Technology **Department of** Process Engineering and Chemical Technology

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Discipline[i] chemical sciences [NCh] none

Optional

Key words (obligatory four key words describing research interests / expertise):

multiphase processes

carbon capture and utilization

carbonation

biofuels

Bibliometric indicators

1. Number of journal publications in WoS/ Scopus 15/14
2. Citations excluding self-citations WoS 83 Scopus 100
3. Hirsch index WoS 7 Scopus 8

1. The number of PhD students who have graduated under your supervision: none
2. The number of PhD students currently supervised:
   a. within the current doctoral school none
   b. within doctoral studies (previous system) none
3. Are you currently accepting new PhD students:
   a. Polish *Yes/No* Yes
   b. Foreign *Yes/No* Yes

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

The proposed research topic concerns the use of the electrochemical reduction of carbon dioxide towards the production of organic chemicals. Currently, various methods to reduce the concentration of carbon dioxide in the atmosphere are currently proposed and developed. New methods for the capture, storage and utilization of carbon dioxide allow the transformation of waste CO2 into valuable products such as chemicals and fuels. This can be achieved through the carboxylation reaction, where the CO2 molecule is used as a precursor to form organic molecules such as carbonates, acrylates or polymers. It is also possible to carry out a reduction reaction, where it is possible to produce, among others methane, methanol, syngas, urea or formic acid. Electrochemical conversion of carbon dioxide is promising technologies for CO2 recycling. However, this technology is still in development and requires solutions to problems that do not allow satisfactory levels of CO2 conversion. The problems that should be solved include the development of new cathode materials, increased catalyst activity and product selectivity, the development of new cell and electrodes configuration, and an understanding of reaction mechanisms. This topic is focused on the development of new electrolytes that minimize or suppress the formation of hydrogen and enhancing the solubility of carbon dioxide in the reaction medium. These issues are indicated as having great potential for improving the carbon dioxide electrochemical reduction process.

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

1. Is funding available for experimental work: *Yes/No/not needed* — No
2. Is the equipment needed to complete a PhD project available in your lab/department: *Yes/No/not needed* — Yes

Most important publications – no more than 5 published after 1.01.2018

No	Authors/title/journal	Number of points according to the current list of the Ministry of Science and Higher Education	Publication year
1.	Konopacka-Łyskawa D., Synthesis Methods and Favorable Conditions for Spherical Vaterite Precipitation: A Review, Crystals, 9(4) (2019) 1-16. doi:10.3390/cryst9040223	70	2019
2.	Konopacka-Łyskawa D., Czaplicka N., Kościelska B., Łapiński M., Gębicki J., Influence of selected saccharides on the precipitation of calcium-vaterite mixtures by the CO2 bubbling method, Crystals 9 (2) (2019) 1-10. doi:10.3390/cryst9020117	70	2019

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3.	Konopacka-Łyskawa D., Kościelska B., Łapiński M., Precipitation of spherical vaterite particles via carbonation route in the bubble column and the gas-lift reactor, JOM 71 (2019) 1041-1048. doi:10.1007/s11837-018-3307-0	100	2019
4.	Kucharska K., Hołowcz I., Konopacka-Łyskawa D., Rybarczyk P., Kamiński M., Key issues in modeling and optimization of lignocellulosic biomass fermentative conversion to gaseous biofuels, Renew. Energy 129 (2018) 384-408. doi:10.1016/j.renene.2018.06.018	140	2018
5.	Łukajtis R., Rybarczyk P., Kucharska K., Konopacka-Łyskawa D., Słupek E., Wychodnik K., Kamiński M., Optimization of Saccharification conditions of lignocellulosic biomass under alkaline pre-treatment and enzymatic hydrolysis, Energies 11 (2018) 886. doi:10.3390/en11040886	140	2018

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

No	Project title, the name of the Principal Investigator (PI) and the institution the project was carried out	Years	Role in the project [iv]
1.	"Badania zasadowej hydrolizy biomasy lignocelulozowej oraz warunków konwersji produktów do biogazu"; Grant NCN 2014/13/B/ST8/04258	2016-2018	R
2.			PI
3.			PI

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Additional relevant information – (no more than 1600 characters)[v]

[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 2000 characters

[iii] Leave only one answer

[iv] Select the role in the project: PI stands for principal investigator (refers to the holder of an independent grant and the lead researcher for the grant project), Co-I for co-investigator (Co-I assists the principal investigator in the management and leadership of the research project), R for researcher

[v] Add any other relevant information e.g. awards for PhD students whom you supervised (no more than 1600 characters)