

Competition notice

Project title: Fly ashes as the precursors of functionalized materials for applications in environmental engineering, civil engineering and agriculture

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Project description: This TEAM-NET joint project assumes using fly ashes as a precursor for the synthesis of novel functionalized materials with the structure of not only zeolites, but also mesoporous silica materials and metal-organic frameworks (MOFs). Then produced materials will be tested for possible applications in agriculture, civil and environmental engineering. With the implementation of new technologies of coal combustion and flue gas treatment, new types of fly ashes with increased content of unburned carbon (up to 30%) have been produced. Such byproducts will be used in this project for the synthesis of novel zeolite-carbon composites. Previous work related to the use of this type of fly ashes was focused on the separate production of zeolites or activated carbons, which did not fully exploit the potential of the above-mentioned byproducts. Their use as a precursor to the synthesis of a zeolite-carbon-vermiculite composite in this project will also pave the way for developing a novel material to replace vermiculite raw materials in agricultural applications.

With this announcement we are looking for a Ph.D. student for the work-package #6 "Production of biostimulants of crop plant growth and of composting process and production of bioinhibitors of phytopathogen growth based on functionalized materials derived from fly ash and bacterial inoculants". The aim of WP #6 is to develop microbial biostimulants of crop plant growth and of biocomposting as well as biological inhibitors of phytopathogen growth. Strains selected from the culture collection of the University of Warsaw will be analyzed for their ability to survive in soil environment (including extreme conditions, e.g. low temperature). The influence of the application of microbial strains on plant growth, plant resistance to unfavorable environmental conditions and phytopathogen growth in soil will also be analyzed. In the next stage, a process manual for the immobilization of selected strains on functionalized materials and on natural carriers (e.g. zeolites) will be developed. The influence of carrier conditioning on the survival and activity of immobilized microorganisms will also be investigated. Experimental verification of biopreparations on the laboratory and pilot scales (pot experiments and micro-field experiments, respectively) will also be carried out. In addition, the effect of biopreparation application on the structure and biodiversity of the soil microbiome (both bacterial and fungal) will be determined.

Requirement

1. The candidate must be a Master degree in the field of: microbiology or biology, biotechnology.
2. The candidate must be experienced in the subject area of the work-package #6(see above).
3. The candidate must be fluent in English (both speaking and writing).
4. The candidate must know the methods which will be used for: (i) isolation and characterization of microorganisms; (ii) analytical analysis; (iii) enzymatic assays (iv) soil analysis
5. The candidate must have a strong interest and knowledge in the field of microbiology, plant microbe interaction and biological control
6. Preferentially, the candidate should know and have and an experience in analytical methods used for the analysis of organic acid, heavy metals etc.
7. The candidate must have an experience in taking part in projects in the area of microbiology or agriculture microbiology or sustainable agriculture.
8. Knowledge of statistics is desirable but not essential.

Discipline: Biological sciences

Admission limit: 1

Recruitment schedule

- registration in the Internet Registration of Candidates, referred to as “IRK”, submitting an application to the IRK: 23.11.2020-10.12.2020
- qualification procedure: 14.12.2020-17.12.2020
- announcement of the ranking list: 21.12.2020
- accepting documents from qualified candidates: 22.12.2020-27.01.2021 2:00pm
- announcement of the list of accepted candidates: 31.01.2021

Recruitment fee

150 PLN

Form of the selection procedure

Evaluation of the following elements shall be taken into account in the selection process:

- 1) scientific activity of the candidate based on a CV or resumé, documented with scans of materials attached to the application for admission to the School;
- 2) interview with the candidate.

Language of the selection process, including the interview

The interview shall be carried out in Polish or English – in accordance with the candidate’s preferences presented in IRK. If the Polish language is selected, the interview may include parts in English.

Required documents

The candidate shall submit the application for admission to the School only in IRK. It shall include:

- 1) the application for admission to the Doctoral School;
- 2) scan of a diploma of completion of the long-cycle Master’s degree programme or second-cycle programme or an equivalent diploma obtained under separate regulations or –in the case of candidates pursuing education within the European Higher Education Areas –a declaration that the diploma or certificate of obtaining a Master’s degree shall be provided by 27.01.2021, in the case of holding a diploma equivalent to the diploma of completion of the long-cycle Master’s degree programme or second-cycle programme, the candidate shall justify this equivalence;
- 3) a resumé or curriculum vitae containing information about scientific activities, including scientific interests and scientific achievements during five calendar years preceding the submission of the application, subject to § 18 s. 5, according to the structure: (i) a detailed description of the academic degrees and titles, titles of theses (bachelor and master, along with short description of main achievements in each thesis – up to 300 characters including spaces), years of receiving the degree/academic title, names and affiliation of supervisors and reviewers of each thesis; (ii) The academic career – chronological indication of places of employment with the indication of posts and contact details of the direct supervisor; (iii) List of scientific publications/monographs/books/chapters – including the full list of authors, an indication whether the candidate was the corresponding author of the given publication, title, full title of

the journal and 5-year IF; (iv) Participation in conferences (list of conferences in which the candidate took an active part, stating whether it was a lecture or a poster), internships abroad (research stays), and most important trainings; (v) List of awards and distinctions, including their range (international/national)

- 4) scans of materials confirming scientific activities referred to in the resumé or CV;
- 5) a document confirming the command of English at least at B2 level or declaration about the command of English to the extent enabling the education in the school;
- 6) a scan of the declaration of the supervisor candidate about their willingness to be the candidate's supervisor and the number of doctoral students, for whom they are appointed as the supervisor, in accordance with the template determined by the Rector; additionally, the candidate can enclose a scan of the opinion of the supervisor candidate and opinions of other academic staff on the candidate and their scientific activities or the proposed research project;
- 7) one photograph of the candidate's face, allowing their identification;
- 8) declaration whether the candidate is or was a doctoral student or participant of doctoral studies, and if yes – title of doctoral dissertation or the research project prepared by the candidate, as well as first name and surname of the academic tutor or the supervisor;
- 9) declaration on familiarising themselves with the content of the Resolution, as well as Article 40 and Article 41 of the Code of Administrative Procedure;
- 10) scans of transcripts of records of the first and second cycle programmes, the long-cycle Master's degree programme or equivalent documents (e.g. diploma supplement);
- 11) abstract of the master's thesis or draft master's thesis in English (up to 3,000 characters with spaces);

Evaluation criteria

1. Fulfilling formal requirements (YES/NO)
2. Compliance of the candidate's profile with the subject of the project, useful skills from the point of view of the planned research (max. 10 points)
3. Candidates' achievements (awards, activity in research clubs and conferences) (max. 15 points)
4. Research experience internships and trainings (max. 15 points)
5. Assessment of self-presentation (max. 15 points)
6. Assessment of answers to committee questions (max. 45 points)

Education program

The education lasts 4 years. It includes obligatory classes (no more than 300 hours in total during the whole period of education) and the implementation of an individual research program, carried out under the supervision of a supervisor. Beginning of education - March 1st, 2021.

Scholarships

During the four years of study, the PhD student receives a scholarship in the amount of 3 800 PLN gross-gross of full remuneration cost (for the time of the project). After, doctoral scholarship in the amount provided for in the general regulations.