Jobbnorge ID: 260268
Deadline: 4/28/2024
Website: http://www.ntnu.no
Scope: Fulltime
Duration: Permanent

The Department of Chemical Engineering has a vacancy for a

PhD Candidate in absorption-based CO2 capture focusing on solvent management

This is NTNU

NTNU is a broad-based university with a technical-scientific profile and a focus in professional education. The university is located in three cities with headquarters in Trondheim.

At NTNU, 9,000 employees and 43,000 students work to create knowledge for a better world.

You will find more information about working at NTNU and the application process here.

Video: https://youtu.be/Xt-yHCN5QS0

About the job

For a position as a PhD Candidate, the goal is a completed doctoral education up to an obtained doctoral degree.

Department of Chemical Engineering seeks a PhD candidate to investigate solvent management technologies in amine-based CO2 capture plants.

This position at the Department of Chemical Engineering at NTNU focuses on solvent management technologies for CO2 capture process. Carbon dioxide (CO2) is the primary greenhouse gas emitted through human activities, and the development and implementation of technologies for CO2 emission reduction is of great importance. Of the various methods to separate CO2 from industrial gases, absorption-based CO2 capture using aqueous alkanolamine solutions has reached the commercial stage. Two of the remaining challenges are closely linked: solvent (amine) degradation and equipment corrosion. Degradation is the irreversible transformation of an absorbent solution into other compounds that may cause equipment corrosion, amine loss, fouling, foaming, reduction of CO2 absorption capacity and more.

This PhD work focuses on technical solutions to control and limit corrosion and degradation and their impact through process modelling and experimental work. These solutions include, among others, thermal reclaiming, ion exchange and oxygen removal. As the technical solutions also impact the overall solvent losses, volatile emissions of degradation and solvent compounds, the aim is to build a process model that also covers these parts.

The latest starting date for the position is the 1st of October 2024.

Duties of the position

- Conduct independent research including activities, in collaboration with the project team. The activities include:
  - Literature review and selection of solvent management concepts to focus on
  - Simulation of the different designs of absorption-based CO2 capture process.
  - Modelling combined with process simulations to build a process model covering solvent degradation and solvent and degradation compound emission to study process designs and operation modes to reduce degradation and overall solvent losses.
  - Evaluate various solvent management technologies, like solvent reclaiming, ion exchange, and oxygen removal technologies.
  - Experimental work to test selected management technologies including
  - Assessment of the results including evaluation of simplifications, and uncertainties and their impact on the results.
- Present the performed work and progress internally and externally
- Publish the result in recognised scientific journals
- Take part in the mandatory PhD research education program

The candidate is further expected to:

- Participate actively in group and institute activities.
- Collaborate with other PhD candidates and research partners
- Contribute to the supervision of undergraduate students.

Required selection criteria

- You must have experience in using process simulation tools (like Aspen plus, Aspen Hysys or similiar) and experience in modelling using Matlab, Python or similar
- You are familiar with absorption processes
- You must have a professionally relevant background in Chemical Engineering or equivalent
- Your education must correspond to a five-year Norwegian degree program, where 120 credits are obtained at master's level
- You must have a strong academic background from your previous studies and an average grade from the master's degree program, or equivalent education, which is equal to B or better compared with NTNU's grading scale. If you do not have letter grades from previous studies, you must have an equally good academic basis. If you have a weaker grade background, you may be assessed if you can document that you are particularly suitable for a PhD education.
- Master's students can apply, but the master's degree must be obtained and documented within 3 months after the start of the position.
- The position requires spoken and written fluency in English.
- You must meet the requirements for admission to the faculty's doctoral program

The appointment is to be made in accordance with Regulations on terms of employment for positions such as postdoctoral fellow, Phd candidate, research assistant and specialist candidate and Regulations concerning the degrees of Philosophiae Doctor (PhD) and Philosodophiae Doctor (PhD) in artistic research national guidelines for appointment as PhD, post doctor and research assistant

Preferred selection criteria

- Knowledge and experience in chemical absorption to absorb CO2
- Experience with preparing and delivering scientific presentations
- Experimental experience especially in operating setups for liquid systems.

Personal characteristics

- Self-driven and persistent- able to plan and organise own work in a systematic way
- Team player - able to work with others
- Curious - eager to learn new things
- Positive and enthusiastic
- Critical - ability to question and reflect on own and others' work
- Good communicator

Emphasis will be placed on personal and interpersonal qualities.

We offer

- exciting and stimulating tasks in a strong international academic environment
- an open and inclusive work environment with dedicated colleagues
- favourable terms in the Norwegian Public Service Pension Fund
- employee benefits

Salary and conditions

As a PhD candidate (code 1017) you are normally paid from gross NOK 532 200 per annum before tax, depending on qualifications and seniority. From the salary, 2% is deducted as a contribution to the Norwegian Public Service Pension Fund.

The period of employment is 3 years.

Appointment to a PhD position requires that you are admitted to the PhD programme within three months of employment, and that you participate in an organized PhD programme during the employment period.

The engagement is to be made in accordance with the regulations in force concerning State Employees and Civil Servants, and the acts relating to Control of the Export of Strategic Goods, Services and Technology. Candidates who by assessment of the application and attachment are seen to conflict with the criteria in the latter law will be prohibited from recruitment to NTNU. After the appointment you must assume that there may be changes in the area of work.

The position is subject to external funding.

It is a prerequisite you can be present at and accessible to the institution daily.

About the application

The application and supporting documentation to be used as the basis for the assessment must be in English.

Publications and other scientific work must be attached to the application. Please note that your application will be considered based solely on information submitted by the application deadline. You must therefore ensure that your application clearly demonstrates how your skills and experience fulfil the criteria specified above.

The application must include:

- CV and certificates

- transcripts and diplomas for bachelor's and master's degrees. If you have not completed the master's degree, you must submit a confirmation that the master's thesis has been submitted.
- A copy of the master's thesis. If you recently have submitted your master's thesis, you can attach a draft of the thesis. Documentation of a completed master's degree must be presented before taking up the position.
- Name and contact information of three referees
- If you have publications or other relevant research work

If all, or parts, of your education has been taken abroad, we also ask you to attach documentation of the scope and quality of your entire education, both bachelor's and master's education, in addition to other higher education. Description of the documentation required can be found here. If you already have a statement from NOKUT, please attach this as well.

We will take joint work into account. If it is difficult to identify your efforts in the joint work, you must enclose a short description of your participation.

In the evaluation of which candidate is best qualified, emphasis will be placed on education, experience and personal and interpersonal qualities. Motivation, ambitions, and potential will also count in the assessment of the candidates.

NTNU is committed to following evaluation criteria for research quality according to The San Francisco Declaration on Research Assessment - DORA.

General information

Working at NTNU

NTNU believes that inclusion and diversity is our strength. We want to recruit people with different competencies, educational backgrounds, life experiences and perspectives to contribute to solving our social responsibilities within education and research. We will facilitate for our employees' needs.

NTNU is working actively to increase the number of women employed in scientific positions and has a number of resources to promote equality.

The city of Trondheim is a modern European city with a rich cultural scene. Trondheim is the innovation capital of Norway with a population of 200,000. The Norwegian welfare state, including healthcare, schools, kindergartens and overall equality, is probably the best of its kind in the world. Professional subsidized day-care for children is easily available. Furthermore, Trondheim offers great opportunities for education (including international schools) and possibilities to enjoy nature, culture and family life and has low crime rates and clean air quality.

As an employee at NTNU, you must at all times adhere to the changes that the development in the subject entails and the organizational changes that are adopted.

A public list of applicants with name, age, job title and municipality of residence is prepared after the application deadline. If you want to reserve yourself from entry on the public applicant list, this must be justified. Assessment will be made in accordance with current legislation. You will be notified if the reservation is not accepted.

If you have any questions about the position, please contact HR Advisor, email merete.thyholdt@ntnu.no. If you have any questions about the recruitment process, please contact Professor Hanna Knuutila, e-mail: hanna.knuutila@ntnu.no

If you think this looks interesting and in line with your qualifications, please submit your application electronically via jobbnorge.no with your CV, diplomas and certificates attached. Applications submitted elsewhere will not be considered. Upon request, you must be able to obtain certified copies of your documentation.

Application deadline: 28.04.2024

NTNU - knowledge for a better world

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The Norwegian University of Science and Technology (NTNU) creates knowledge for a better world and solutions that can change everyday life.

Department of Chemical Engineering

We take chemistry from laboratory scale to industrial production. This demands a wide range of knowledge, from molecular processes and nanotechnology to building and operation of large processing plants. We educate graduates for some of Norway's most important industries. The Department of Chemical Engineering is one of eight departments in the Faculty of Natural Sciences.

Additional information

Place of service:

Høgskoleringen 1 7491 Trondheim (Trondheim Municipality)