

# Research, Informatics and Graduate Studies

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## Research Fellow/Post Doc Position in Advanced Membrane Technology (AMT) group of Prof. Xuezhong He (RF-2020003)

### Description

The Chemical Engineering Program (the group of Xuezhong He) is looking for one scientist to conduct membrane researches within polymeric and/or carbon membranes for gas separations. Contract duration: 3 years.

### Project Details

Gas separation membranes require no or very little chemicals compared to standard unit operations and attract increased interest for environmentally friendly energy processes. Different types of membranes such as common polymers, microporous organic polymers, fixed-site-carrier membranes, mixed matrix membranes, carbon membranes as well as inorganic membranes have been investigated for CO<sub>2</sub> capture/removal and other energy processes in the last two decades. To make competitive membranes with other separation technologies, further improvement of membrane performance related to both gas permeance and selectivity is highly required.

The project is intended to develop innovative high-performance membranes for CO<sub>2</sub> related applications such as CO<sub>2</sub>/N<sub>2</sub> separation, H<sub>2</sub> purification, and CO<sub>2</sub>/CH<sub>4</sub> separation. The work for the Post Doc includes the development of flat-sheet and/or hollow fiber membranes (mixed matrix membranes, carbon membranes, facilitated transport membranes, etc.), membrane characterizations based on SEM, XRD, XPS, TEM, gas sorption, etc., and membrane performance testing as well as process simulation. We are seeking a person with an interest in the combination of both experiments and simulation. The experimental work including, but not limited to, membrane casting or coating, hollow fiber spinning, and gas permeation testing using single gas and gas mixture. Multi-scale simulation of membrane transport mechanisms or processes may also be considered. For further details of the research projects, please contact Prof. He.

### Duties and Responsibilities

#### 1. Research 70%

Develop novel membrane materials to enhance gas separation performance. Proposing novel mixed matrix membranes and facilitated transport membranes is highly required to break through the Robeson upper bound, and move the membrane performance towards the industrial attractive region. The development of inorganic membranes such as supported carbon membranes or self-supported hollow fiber carbon membranes is also required for the high-temperature and high-pressure applications. Molecular simulation combined with experiments may be applied to understand the membrane separation mechanisms.

#### 2. Dissemination 15%

Write scientific articles for publishing in high-quality, peer-reviewed journals. present scientific results at professional conferences, workshops, and seminars. Help to write proposals for funding opportunities with the group leader.

#### 3. Safety and Training 5%

### Program

Chemical Engineering Program

### Research Area

Advanced Membrane Technology

### Contacts

Xuezhong He

Email: [xuezhong.he@gtiit.edu.cn](mailto:xuezhong.he@gtiit.edu.cn)

[Webpage Link](#)

### Application Deadline

20 February 2022

### Date Posted

14 Sep, 2020

Ensure all relevant safety and policies and procedures are followed. Complete the required safety and compliance training.

#### 4. Other duties as assigned 10%

Other duties are assigned, including mentoring of graduate students within the group, building up research infrastructure, and professional developments.

### Keywords

Gas separation membranes, mixed matrix membranes, facilitated transport membranes, carbon membranes, hollow fibers, CO<sub>2</sub> capture, hydrogen purification, process simulation.

### Selection Criteria

- PhD degree in Chemical Engineering or Material Science and Engineering (essential)
- Strong background in gas separation membrane development and application (essential)
- Experience of preparation of flat-sheet and/or hollow fiber membranes for different gas separations (essential)
- Experience of membrane material characterization (essential)
- Publications of at least two articles in the peer-review journals (highly desired)
- Experience of process simulation (considered as an advantage)
- Highly self-motivated and able to work independently with minimal supervision (desired)

### Benefits

- Salary range: up to \$49,020 / year (depending on qualifications of the candidate)
- Subsidized housing at GTIIT, China
- Health insurance: regular cover for Chinese citizens or private health insurance for foreigners
- Professional conference travel allowance

### Application

- Application deadline: **Continuous till filled**
- Send below required documents electronically to: [xuezhong.he@gtiit.edu.cn](mailto:xuezhong.he@gtiit.edu.cn)
  1. Curriculum vitae and personal statements
  2. A publication list
  3. Three letters of recommendation (one from the mentor for PhD and/or Master's studies)
  4. A short research plan outline (up to one page in length)
  5. Degree certificates with certified English translation for both the PhD and Master's degrees