

## Postdoc Fellowships in Various Hydrogen Research Disciplines at IRC-HES KFUPM 2024

We are looking for postdoc candidates having excellent research experience in the following hydrogen research fields (**Production, Separation, Storage, and Utilization**):

1. Experimental and numerical estimation for clean combustion of hydrogen
2. Hydrogen production through gasification/steam–methane reforming of hydrocarbons
3. Catalytic decomposition of ammonia for hydrogen production
4. Electrocatalysts and membranes development for green hydrogen production via water splitting (PEM, AEM electrolyzers)
5. Dense metallic membranes for hydrogen separation and purification
6. Superalloys, high entropy alloys, and metal hydrides for hydrogen storage
7. Heterogeneous catalysis (e.g., LOHC) for hydrogen storage and transportation
8. Hydrogen storage in porous materials (MOFs, zeolites, and carbonaceous materials)
9. Density Functional Theory (VASP/ Quantum Espresso/ CASTEP/ LAMMPS) for hydrogen production and storage
10. Artificial intelligence and machine learning (ML) tools for theoretical and simulation studies for all the above hydrogen research disciplines.

Broad discipline of candidates – **Chemical/Process Engineering, Material Engineering, Mechanical Engineering, Inorganic/Organic/Computational Chemistry, and Physics.**

The specializations and competencies required – **Designing and development of reactors for various catalytic processes integrated with artificial intelligence.**

**Job Description** – We aim to develop prototype devices for (i) Green and blue hydrogen production and (ii) Hydrogen storage integrated with artificial intelligence and machine learning capabilities. The candidate should have excellent knowledge in the abovementioned areas witnessed with high-quality publications. Applicants must hold a doctoral degree (PhD) from a reputable university, obtained within the last 2-3 years in a relevant discipline.

### **Job Responsibility**

- Design, synthesis, and characterization of materials.
- Design and development of catalytic reactors & protocols for catalytic reactions.
- Gasification process, design and development of gasification plants, and different software to monitor gasification process.
- Develop prototype devices for various hydrogen research disciplines.
- Data analyses, interpretation, and reporting.
- Mentorship of PhD, MSc, and/or BSc students.

**In addition:** Excellent publication record in the field of required expertise, ability to develop and implement new research ideas, and perform advanced experiments – Excellent speaking, writing, and communication skills.

E-mail inquiries prior to making an application are welcome, in which case contact Professor Zain H. Yamani ([zhyamani@kfupm.edu.sa](mailto:zhyamani@kfupm.edu.sa)).

## **Postdoc Fellowships in Carbon Capture, Utilization, and Storage (CCUS) at IRC-HES KFUPM 2024**

We are looking for postdoc candidates having excellent research experience in the following hydrogen research fields (**Carbon Capture, Utilization, and Storage**):

1. Synthesis, characterization, and application of (MOF, COF, POPs) particularly in the context of CO<sub>2</sub> capture applications.
2. Heterogeneous catalysis, and thermochemical reaction engineering for clean energy applications, including renewable H<sub>2</sub> production and CO<sub>2</sub> conversion.
3. Blue hydrogen production through sorption-enhanced reforming
4. Electrochemical CO<sub>2</sub> conversion to C<sub>2</sub> products (Ethanol, Ethylene).
5. Technology development for CO<sub>2</sub> sequestration and utilization.
6. Dynamic Flow Modelling Supercritical / Dense-Phase CO<sub>2</sub> for modeling CO<sub>2</sub> transportation pipelines.
7. Techno-economic analysis and life cycle assessments (LCA) for CCUS.
8. Density Functional Theory (VASP/ Quantum Espresso/ CASTEP/ LAMMPS) for CCUS.
9. Artificial intelligence and machine learning (ML) tools for theoretical and simulation studies for all the above CCUS research disciplines.

Broad discipline of candidates – **Chemical/Process Engineering, Material Engineering, Mechanical Engineering, System Engineering, Inorganic/Organic/Computational Chemistry, and Physics.**

The specializations and competencies required – **Designing and development of reactors for various catalytic processes integrated with artificial intelligence.**

**Job Description** – Interdisciplinary Research Center for Hydrogen and Energy Storage (IRC-HES) at KFUPM is looking for brilliant and dedicated postdoc candidates to support R&D activities in the area of Carbon Capture, Utilization, and Storage (CCUS). The candidate should have excellent knowledge in the abovementioned areas witnessed with high-quality publications. Applicants must hold a doctoral degree (PhD) from a reputable university, obtained within the last 2-3 years in a relevant discipline.

### **Job Responsibility**

Design, synthesis, and characterization of high-performance engineering materials for

- Carbon capture either from direct air and/or flue gas.
- Conduct adsorption and thermodynamics studies.
- Data analyses, interpretation, and reporting.
- Modelling and simulation with different tools (AI, ML).
- Mentorship of PhD, MSc, and/or BSc students.

**In addition:** Excellent publication record in the field of required expertise, ability to develop and implement new research ideas, and perform advanced experiments – Excellent speaking, writing, and communication skills.

E-mail inquiries prior to making an application are welcome, in which case contact Professor Zain H. Yamani ([zhyamani@kfupm.edu.sa](mailto:zhyamani@kfupm.edu.sa)).

# Post-Doc Positions in Social and Policy Research for Hydrogen and Carbon Management

## Job Description:

The Interdisciplinary Research Center for Hydrogen Technologies and Carbon Management (HTCM) at KFUPM invites highly motivated and dedicated post-doctoral candidates to contribute to our dynamic team. We are seeking individuals with expertise in the Social and Policy aspects of Hydrogen and Carbon Management to enhance our research and development activities. A detailed job description of the topic is given below.

### Topic 1. Social Impact and Policy Analysis of the Hydrogen Economy

This position centers on exploring the social impact and policy analysis of the hydrogen economy, with a particular emphasis on the following dimensions:

- a. Hydrogen mobility and transportation
- b. Hydrogen risk management
- c. Hydrogen economy, social impact, sustainable development goals, and policy insights
- d. Industrial decarbonization via hydrogen
- e. Public understanding and social acceptance of hydrogen energy and its technology
- f. Sustainable hydrogen society
- g. Hydrogen energy and environment

### Topic 2. Carbon Management for a Sustainable Future

The primary focus of this role is to study the social impact and policy analysis related to carbon management in the following domains.

- a. Carbon management systems
- b. Carbon management and sustainability goals
- c. Carbon management in urbanization
- d. Carbon management at household level
- e. Carbon management and social analysis
- f. Carbon management in logistics and transportation
- g. Carbon management in tourism.

## Desired Requirements:

We are seeking an exceptional Ph.D. holder candidate with experience in either topic mentioned above. Furthermore, a candidate must check the KFUPM criteria and qualifications from the website <https://postdoc.kfupm.edu.sa/how-to-apply.html>

The selected candidate will conduct comprehensive research related to those mentioned above or relevant topics. Responsibilities include active involvement in data analysis, interpretation, report generation, regular presentations, and contributing to developing patents and manuscripts.

## Contact

E-mail inquiries prior to making an application are welcome, in which case, send your CV and cover letter to HTCM center ([irc-htcm@kfupm.edu.sa](mailto:irc-htcm@kfupm.edu.sa)) and/or Dr. Muhammad Saeed ([msaeedpk@kfupm.edu.sa](mailto:msaeedpk@kfupm.edu.sa))