



Interdisciplinary Research Center for Refining & Advanced Chemicals (IRC-RAC)

Post Doc Positions at IRC-RAC

The Interdisciplinary Research Centre for Refining & Advanced Chemicals (IRC-RAC) at King Fahd University of Petroleum & Minerals (KFUPM), Dhahran, Saudi Arabia is looking for postdoctoral researchers in the following research areas. The initial duration of the contract will be 2 years extendable based on performance and project duration:

- 1. Optimization of refinery and chemical processes:** The candidate should have background in chemical engineering and be familiar with process modeling. The ideal candidate should have good knowledge and work in mathematical modeling and programming (including linear, nonlinear, integer, and multi-objective programming). He should be able to use various optimization software, analyze data and prepare manuscripts.
- 2. Thermochemical upgradation of bio-waste (municipal solid waste):** The candidate must have hands-on experience with the catalytic thermochemical conversion of biomass to chemicals. The candidate is expected to have a good grip on analytical techniques required for catalyst, biomass, and final product characterization. Preference will be given to candidates with a Chemical Engineering or related discipline background. Working experience with pilot-scale thermochemical setup will be given special consideration.
- 3. Gas hydrates for separation and hydrate inhibition:** The applicant must have experience in the analysis of gas hydrates using Raman spectroscopy, neutron scattering and X-ray diffraction. The ideal candidate must have fundamental background of gas hydrates and its related applications. The candidate is expected to have a good theoretical background on the mechanism controlling rapid kinetics of hydrate formation and understanding of the nucleation theory. Preference will be given to candidates with a Chemical Engineering or Chemistry background. The applicant should be familiar with working with both Gas Hydrate Autoclaves or Rocking Cell.
- 4. Biocatalytic transformations:** Highly motivated Postdoctoral Researcher to work with a team that uses enzymes to carry out organic transformations (i.e. biocatalysis). More specifically, the research work includes conducting enzyme-catalyzed organic transformations and characterization of reaction products using traditional spectroscopic tools. The team is also involved in enzyme encapsulation to enable the utilization of more than one enzyme in one pot such as deracemization reactions of alcohols including dynamic kinetic resolution, stereoinversion, and cyclic deracemization. Additional areas of expertise, which is considered a plus for the applicant, includes enzyme kinetics, molecular docking of substrates in the active sites of enzymes. Biocatalysis is the use of enzymes to replace traditional catalysts to



carry out chemical transformations. This sustainable approach has gained significant interest in the industrial sector.

5. **Heterogeneous Catalysis:** The candidate with background in pure heterogeneous catalysis, dealing with Hydrocarbon cracking, CO₂ utilization through hydrogenation and dry reforming of methane etc. In addition, relevant experience in synthesis, characterization and analysis of solid catalysts (zeolites, MOFs, mesoporous alumina and silica, 2D materials etc.) are required.
6. **Design and development of adsorbent materials:** The candidate with the background of design and development of adsorbent materials (such as zeolite, graphene, SAPO, activated carbon, MOFs, etc.) for research work focused on Separation and Purification of Gases. The ideal candidate must have hands-on experience with separation and purification of gases based on adsorbents. The candidate is expected to have a good grip on analytical techniques required for making extrudates/beads and characterization of adsorbents as well as performance evaluation of adsorbent materials. Preference will be given to candidates with a Chemical Engineering or Chemistry or background in related discipline. Working experience with gas separation & purification technique will be given special consideration such as operating fixed adsorption column flow system to determine breakthrough point and separation efficiency of mixture of gases and experience of handling GCs.
7. **Computational Mathematics:** Scientific computing and numerical analysis of mathematical models applied to computational chemistry and material science. Applied/computational mathematics, computational chemistry, material science or relevant fields. Required skills include: Conducting cutting-edge research in computational mathematics/chemistry, with a particular emphasis on phase transition and interfacial dynamics of multi-phase flows. Developing and implementing novel computational models and algorithms with computer programming, pre-and post-processing skills. Excellent and effective communication skills and ability to work with interdisciplinary team members.

Only candidates who satisfy the below criteria will be considered for the position:

- Recent graduate (2021 or later)
- PhD granting university ranked in top 200 universities as per QS Ranking
- High GPA (preferably > 3.5/4) with no low grades (D or F) in BS, Master or PhD.
- Strong publication record (h index > 5).

Interested candidates should submit a detail CV to crac@kfupm.edu.sa.

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