Research Centre for Gas Innovation

Lead institution: Chemistry Institute / USP	
Supervisor name: Liane Marcia Rossi/Pedro Vidinha	**Department: Chemistry**
Recipient: **https://sites.usp.br/rcgi/opportunities/** **Ref: 23PDR210 - Postdoctoral fellowship** **Deadline for submission: June 15th, 2023**	**Type:** 2 Postdoctoral fellowship **Period:** August 1th, 2023 to July 30th,2024 **Number of months:** 12 **Intended beginning date:** August 1th, 2023

Project title: (Portuguese and English)

Preparação e caracterização de catalisadores para a conversão de etanol e co2 em monômeros

Preparation and characterization of catalysts for the conversion of ethanol and co2 into monomer molecules

Research theme area: **(Portuguese and English)**

Catálise heterogênea, conversão de CO_2, e cinética química.

Heterogeneous catalysis, CO_2 conversion and chemical kinetics.

Abstract (Portuguese and English)

O candidato irá colaborar com os pesquisadores do projeto "Desenvolvimento de rotas catalíticas para transformação de CO_2 em produtos químicos e materiais" Projeto 63 do programa CCU do FAPESP-Shell Centro de Pesquisa para a Inovação em Gases do Efeito Estufa da POLI-USP na Universidade de São Paulo. Resumo do programa e os projetos podem ser encontrados no site da RCGI (http://www.rcgi.poli.USP.br/).

The candidate will collaborate with researchers from the project "Development of catalytic routes for transforming CO_2 into chemicals and materials" of the 63 Project - CCU program of the FAPESP-Shell Research Centre for Gas Innovation of POLI-USP at the University of São Paulo. Summary of the program and projects can be found at the RCGI website (http://www.rcgi.poli.usp.br/).

Description (Portuguese and English)

O pesquisador contribuirá alinhado aos principais objetivos do projeto: Criar valor a partir das emissões de CO_2 através do desenvolvimento de catalisadores e processos catalíticos eficientes baseados em catalise heterogênea. Pretende-se implementar estratégias visando transformar CO_2 em álcoois superiores, especialmente etanol. O candidato atuará no IQ-USP.

The researcher will contribute in line with the main objectives of the project: Create value from CO_2 emissions by developing efficient catalysts and catalytic processes based on heterogeneous catalysis. The candidate will work at IQ-USP.

Brazil is the world's second largest ethanol producer, but the CO_2 emitted during fermentation and bagasse burning end up going into the atmosphere. The capture of CO_2 from sugarcane ethanol refineries and its conversion into chemicals, e.g. methanol, ethanol, acetic acid, is an opportunity to valorize and diversify the Brazilian chemical industry. The market for CO_2 –derived products will likely remain relatively small in the short term, but early funding opportunities will help to develop this technology for the future application. Long-residence-time products, such as polymers, resins, etc., holds promise for contributing to the reduction of CO_2 emissions, while unlocking an opportunity of integration and branching of existing industry chains. There is a large market for products made of ethanol via ethanolchemistry, but only ethylene reached the commercialization

level in Brazil nowadays. Due to the relevance of *creating value from CO_2 emissions*, this project will focus on the conversion of CO_2 into higher alcohols. Development in this field requires the design of efficient processes, by developing better catalysts to unlock high activity and selectivity. Thus, this work plan for PostDoc candidate focuses on the development of heterogeneous catalysts by a combination of several properties for the direct conversion of CO_2 to products.

Requirements to fill the position (Portuguese and English)

O candidato deve possuir doutorado em química ou engenharia química, preferencialmente tendo realizado seus estudos na área de catálise heterogênea, com experiência nas seguintes áreas:
- Preparação de catalisadores metálicos
- Principais técnicas de caracterização (MET, DRX, XPS, XAFS e DRIFT-CO)
- Operação de reator em fluxo, estudos cinéticos e mecanísticos
- Técnicas analíticas (CG, CG-EM, HPLC, etc.)

O candidato deve ter obtido o grau de doutor há no máximo cinco anos e é desejável ter experiência trabalhando em centros de pesquisa no exterior.

The candidate must hold a doctorate in chemistry or chemical engineering, preferably having conducted his studies in the area of heterogeneous catalysis, with experience in the following areas:
- Preparation of metal catalysts
- Characterization techniques (MET, DRX, XPS, XAFS and FTIR)
- Flow reactor operation, Kinetic and mechanistic studies
- Analytical techniques (GC, GC-MS, etc.)

The candidate must have a maximum of five years after concluding the PhD and should have experience outside Brazil working in research centers.

Funding Notes: This Postdoc fellowship is funded by FUSP/Schell. The fellowship will cover a standard maintenance stipend of R$ 8.479,20 per month .

Work place: Unit / Address – Instituto de Química da Universidade de São Paulo, Av. Prof. Lineu Prestes 748, Butantã, São Paulo, Brazil.

Documents/Information to be Sent:

Ref: 23PDR210

1) Fill-in the application form: https://docs.google.com/forms/d/e/1FAIpQLSfV4KkheEQeMJKiDnkVkOQiDm5pvKU28bFJR5uNhYpjgU0Dhw/viewform?usp=sf_link

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In case you have any question, please write to rcgi.opportunities@usp.br