

TEMA PARA DOUTORADO – 1º SEMESTRE DE 2025

ÁREA DE PESQUISA: Sistemas Particulados
Laboratório de Tecnologias Ambientais
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TÍTULO: Desenvolvimento de tecnologias para mitigação e conversão do CO₂ em produtos químicos de interesse industrial

RESUMO

Brazil is the second largest world ethanol producer, being most of its production coming from sugarcane, in a process recognized as sustainable, with its neutral CO₂ emission. Currently, many companies producing ethanol use covered fermentation tanks and washing towers in order to recover the ethanol dragged by the gaseous current generated during the fermentation, which is composed basically by CO₂, which is discharged in the atmosphere. In this scenario, there is a unique opportunity to utilize this CO₂, making this industrial process with negative emissions of this gas, besides the possibility of additional income with carbon credits.

In this project, we propose a new strategy to use the CO₂ from the fermentation process by converting it into chemicals of industrial interest, such as formic acid and methanol, in a concept of biorefinery. Considering the clean Brazilian energy matrix, predominantly from renewable sources (hydraulic, photovoltaic, wind, and biomass), the use of electricity to convert CO₂ into chemicals impose a competitive advantage and aligns well with the Sustainable Development Goals established by the United Nations (<https://www.undp.org/sustainable-development-goals>), thus contributing to mitigate the emissions of greenhouse effect gases.

In this proposal, CO₂ will be electrochemically converted into add-value organic compounds (formic acid and methanol). The specific goals include the development of new electrocatalysts and electrodes of gas diffusion (EDG) for CO₂ reduction aiming to optimize the processes of mass and electron transfer.

O projeto conta com o apoio financeiro da Fapesp e CNPq.

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PALAVRAS-CHAVE: mitigação CO₂, produtos químicos industriais