

Brought to you by [INTERNATIONAL ISLAMIC UNIVERSITY MALAYSIA](#)



Scopus



[Back](#)

Design and simulate an amine-based CO₂ capture process for a steam methane reforming hydrogen production plant

[IOP Conference Series: Earth and Environmental Science](#) • Conference Paper • [Open Access](#) • 2023 • DOI: 10.1088/1755-1315/1281/1/012048

[Hamed, Ali Mahmoud](#)^a; [Kamaruddin, Tengku Nordayana Akma Tuan](#)^a ; [Ramli, Nabilah](#)^a; [Wahab, Mohd Firdaus Abdul](#)^b

^a Department of Mechanical & Aerospace Engineering, Malaysia

[Show all information](#)

5 94th percentile

Citations

3.18

FWCI

[View PDF](#)

[Full text](#)

[Export](#)

[Save to list](#)

[Document](#)

[Impact](#)

[Cited by \(5\)](#)

[References \(11\)](#)

[Similar documents](#)

Abstract

Steam methane reforming (SMR) is a common technique for hydrogen production, however CO₂, which is created as a by-product, needs to be captured. Chemical absorption utilizing amine solvents is the most economically practical method of CO₂ capturing. Amines are a class of organic compounds that are commonly used as chemical solvents for carbon capture. The effectiveness of a particular amine as a carbon capture solvent depends on its chemical structure and properties. Some commonly used amines for carbon capture include monoethanolamine (MEA), diethanolamine (DEA), and methyldiethanolamine (MDEA). This study aims to simulate SMR hydrogen production plant utilizing amine-based carbon dioxide capture system using Aspen HYSYS V11 software and figure out the efficiency of different chemical solvents in capturing carbon dioxide. The results of this study show that MEA has high efficiency to capture CO₂ due to its high reactivity and ability to form a strong chemical bond with CO₂. However, it is also highly corrosive and can be costly to regenerate. © 2023 Institute of Physics Publishing. All rights reserved.

Funding details

Details about financial support for research, including funding sources and grant numbers as provided in academic publications.

Funding sponsor	Funding number	Acronym
Mechanical & Aerospace department at IIUM		
Direktorat Riset and Pengembangan, Universitas Indonesia See opportunities by DRPM UI ↗	NKB-1480/UN2.RST/HKP.05.00/2022	DRPM UI
Direktorat Riset and Pengembangan, Universitas Indonesia See opportunities by DRPM UI ↗		DRPM UI

Funding text 1

The first author would like to gratefully thank the IIUM-TFW scheme for sponsoring his postgraduate study as well as the Mechanical & Aerospace department at IIUM.

Funding text 2

This research is funded by Directorate of Research and Development, Universitas Indonesia under Hibah PUTI Q2 batch 3 2022 (Grant no. NKB-1480/UN2.RST/HKP.05.00/2022) awarded to Dr. Miktha Farid Alkadri, S.Ars., M.Ars

Corresponding authors

Corresponding author

T.N.A.T. Kamaruddin

Affiliation

Department of Mechanical & Aerospace Engineering, Malaysia

Email address

tengku_dayana@iium.edu.my

© Copyright 2024 Elsevier B.V., All rights reserved.

Abstract

Funding details

Corresponding authors

About Scopus