Pilot scale absorption experiments with carbonic anhydrase-enhanced MDEA-
Benchmarking with 30 wt% MEA - DTU Orbit (14/08/2019)

In this study the CO₂ mass transfer performance of enzyme enhanced MDEA solutions was benchmarked against the industrial standard 30 wt% MEA solution on a pilot packed column (10 m height, 0.1 m diameter). For all 64 experiments (18 for MEA and 46 for enzyme enhanced MDEA) relevant process data for process modelling such as flow rates, temperatures and inlet compositions as well as the overall mass transfer flux were measured. For 18 MEA experiments and 15 enzyme-enhanced MDEA experiments temperature profiles of the column and solvent loading profiles were obtained. In experiments with MEA the column height and the liquid to gas mass flow ratio (L/G) were altered, whereas for enzyme enhanced MDEA in addition to column height and L/G ratio, the effect of enzyme concentration, solvent loading and temperature on the capture efficiency were determined. The experiments clearly show the positive effect of the enzyme addition on CO₂ capture efficiency for the MDEA solvent which can be further increased by adding more enzyme. Enzyme enhanced solvents exhibited around 80% of the mass transfer performance of a 30 wt% MEA solvent solution.

General information
Publication status: Published
Organisations: Center for Energy Resources Engineering, CERE – Center for Energy Resources Engineering, Department of Chemical and Biochemical Engineering, KT Consortium, PROSYS - Process and Systems Engineering Centre, Technical University of Denmark
Corresponding author: von Solms, N.
Pages: 69-85
Publication date: 2019
Peer-reviewed: Yes

Publication information
Volume: 82
ISSN (Print): 1750-5836
Ratings:
BFI (2019): BFI-level 2
Web of Science (2019): Indexed yes
Original language: English
Keywords: Pilot scale, Carbonic anhydrase, Carbon capture, MEA, MDEA
DOIs:
10.1016/j.ijggc.2018.12.017
Source: FindIt
Source-ID: 2443019427
Research output: Contribution to journal › Journal article – Annual report year: 2019 › Research › peer-review