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Publication date:
2016

Document Version
Peer reviewed version

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Citation (APA):

Fosbøl, P. L., Gladis, A., Thomsen, K., Gaspar, J., & von Solms, N. (2016). Enzymes in CO2 Capture. Abstract from 3rd Conference on Carbon Capture and Storage (UTCCS-3), Austin, United States.

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Enzymes in CO₂ capture

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The enzyme Carbonic Anhydrase (CA) can accelerate the absorption rate of CO₂ into aqueous solutions by several-fold. It exist in almost all living organisms and catalyses different important processes like CO₂ transport, respiration and the acid-base balances.

A new technology in the field of carbon capture is the application of enzymes for acceleration of typically slow ternary amines or inorganic carbonates. There is a hidden potential to revive currently infeasible amines which have an interesting low energy consumption for regeneration but too slow kinetics for viable CO₂ capture.

The aim of this work is to discuss the measurements of kinetic properties for CA promoted CO₂ capture solvent systems. The development of a rate-based model for enzymes will be discussed showing the principles of implementation and the results on using a well-known ternary amine for CO₂ capture. Conclusions will be drawn revealing basic unexpected process conditions which are beneficial to enzyme promoted amines like water presence, temperatures, and similar basic variables.