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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.