Lionel Dubois[1]
Patrick Kahasha Mbasha[1]
Diane Thomas[1]

[1] University of Mons, Faculty of Engineering, Chemical Engineering Department, Mons, Belgium.

Research Article

CO_2 Absorption into Aqueous Solutions of a Polyamine, a Sterically Hindered Amine, and their Blends

Among numerous techniques existing for reducing CO_2 emissions, CO_2 capture by absorption in aqueous alkanolamine solutions was specifically studied in this work. For the choice of the adequate amine solution, two major criteria must be taken into account: absorption performances (higher with primary and secondary amines) and energy costs for solvent regeneration (more interesting with tertiary and sterically hindered amines). The different types of amines can also be mixed in order to combine the specific advantages of each type of amines, an activation phenomenon being observed. Aqueous solutions of (piperazinyl-1)-2-ethylamine (PZEA, a polyamine known as absorption activator) and 1-amino-2-propanol (AMP, a sterically hindered amine), pure or mixed with other amines, are experimentally compared with respect to CO_2 removal performances by means of absorption test runs achieved in a special gas-liquid contactor at 25 °C. The positive impact of addition of PZEA to monoethanolamine (MEA), *N*-methyldiethanolamine (MDEA), and AMP solutions was clearly highlighted. The absorption performances have also been satisfactorily simulated with coherent physicochemical data.

Keywords: Absorption, Amines, Carbon dioxide

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