



Key Environmental Issue Webinar Series 11
for Overseas Chinese Environmental Engineers & Scientists Association
海外華人環境保護學會環境議題網上論壇(Eleventh)

CO2 Capture Solvent Selection by the Taguchi Method using Bubble Column Scrubbers

December 11, 2022: 6:00-7:00 PM PDT (9:00-10:00PM EST) /

December 12, 2022: 10:00-11:00 AM 中国标准时间



[About the Speaker] Dr. Pao Chi Chen, born in Chiayi, Taiwan, is a professor at the Department of Chemical and Materials Engineering, Lunghwa University of Science and Technology. Professor Chen received a Bachelor Degree in Chemical Engineering from Chung-Yuan University (1978), and an MSc (1980) and an Engineering Doctor's degree (Ph.D.) (1993) in the Department of Chemical Engineering, National Taiwan University. He is a recipient of a research award from the Ministry of Education, Taiwan during 2010-2021. Professor Chen's current research focuses are Nano-structured lipid carriers, capture of carbon dioxide, nanotechnology, and technology education. He served as the Head of the Department (5 years), Dean of Engineering (3 years), and Dean of Student Affairs (2 years). He is also a board member of OCEESA since 2022.

[Abstract] This two-year project aims to use mixed amines to conduct a CO₂ absorption test and employ a regeneration scrubbed solution containing CO₂. There are five types of mixed amines, namely PZ (piperazine)+MEA (monoethanolamine), PZ+DIPA (diisopropanolamin), PZ+TEA (triethylamine), PZ+AMP (2-amino-2-methyl-1-propanol), and PZ+DETA (diethylenetriamine). In the first year of this study, a continuous bubble-column scrubber was used for testing. The operating variables include the type of mixed amines (A), ratio of mixed amines (B), liquid flow rate (C), gas flow rate (D), concentration of mixed amines (E), and liquid temperature (F), each having five levels. Using Taguchi experimental design, the total number of experiments is $L_{25}(5^6)=25$. The influence of the variables on the absorption efficiency (EF), absorption rate (RA), absorption factor (ϕ), and volumetric overall mass-transfer coefficient (KGa) are explored. The order of importance of parameters and the optimum conditions can be obtained from the Taguchi analysis of the experimental data. The solvent selection was performed according to the Taguchi analysis. Up to now, a total of fifteen-runs tests showed that the absorption efficiency (EF), absorption rate (RA), absorption factor (ϕ), and volumetric overall mass-transfer coefficient (KGa) were found to be 80-100%, 5.27×10^{-4} - 2.02×10^{-3} mol/L·s, 0.381-1.339 1/s, and 0.0664-3.082 mol-CO₂/L·mol-amine, respectively. The 1st year project can be completed by the end of June 2023.

Pre-Register by
[Click here](#) or scan



For Mainland China
[Click here](#) or scan



Moderator: Dr. Sen Li (李森)

Technology Manager and Global
Chair of APEX Resource Group at
Eastman Chemical Company in
Tennessee