

## Operation Recipe Optimization of Semi-Continuous Process

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Carbonation process has been studied to convert gaseous CO<sub>2</sub> to stable form. The process presented in this study has two slurry reactors filled with 20 wt% aqueous solution of calcium hydroxide. The gaseous CO<sub>2</sub> passes through two reactors in series, and calcium carbonate is precipitated. In this process, pH, Temperature, In/Out Gas flow rate and CO<sub>2</sub> fraction can be measured. Since the measurement data does not depend on solely the amount of calcium hydroxide remainder, there is a limit to the design of control systems for satisfying the minimum carbon dioxide removal efficiency of 90% during the operation. For satisfying the purpose, the aqueous solution of calcium hydroxide in the reactor has a replacement cycle like a semi-continuous reactor.

The CO<sub>2</sub> removal efficiency and pH will decrease drastically when calcium hydroxide is depleted in the reactor. The base case of operation recipe is set to remove the product first and then supply the reactant when the calcium hydroxide is depleted. And new operation recipes are suggested to minimize the amount of reactant used.