

# Rotary reactor

Promotes gas-liquid reaction in CO<sub>2</sub> absorption and salt manufacturing process, resulting in equipment downsizing and energy saving

## Overview

For CO<sub>2</sub> fixation and usage, there are many systems that involve mass transfer, reaction and absorption between gas / liquid; for example the reaction of an amine absorption solution or calcium solution with a dilute CO<sub>2</sub>containing gas. The conventional spray, bubble, packed and wetted wall columns are increasing in size in order to increase the reaction interfacial area and detention time.

For the concentration, crystallization and drying in the salt manufacturing process in Japan, the conventional shaft kiln method has the same issue of the equipment size increase. The high energy consumption is also an issue since the bubbles are generated by boiling the liquid phase.

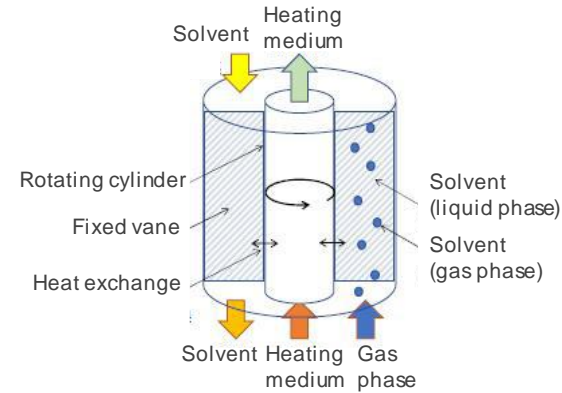
This invention achieves the equipment downsizing by increasing the gas-liquid reaction field area by using the phenomenon that the gas phase introduced into the heat exchange mechanism using a rotary double tube is refined and retained in the solvent by the agitation and shearing force of the rotating cylinder. The heat transfer rate is improved and the energy saving is possible thanks to the removal of precipitate and boundary film on the rotating cylinder.

## Product Application

- Gas-liquid reaction process in CO<sub>2</sub> absorption
- Concentration, crystallization, drying processes in salt manufacturing process
- Other fluid-to-fluid reactions (gas-liquid, liquid-liquid)

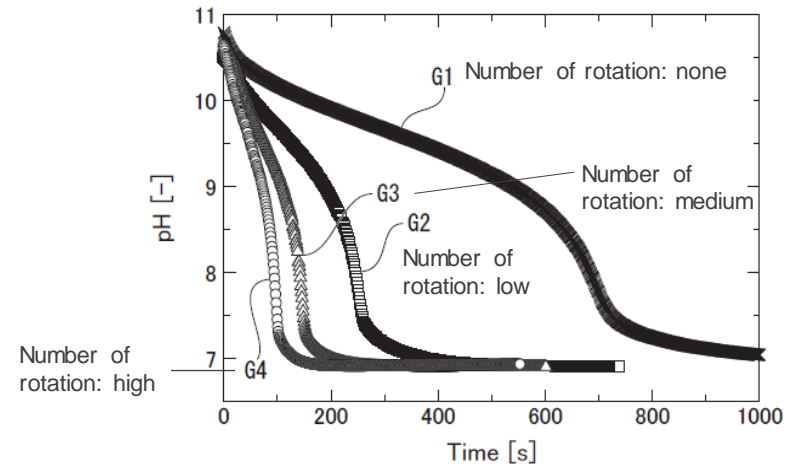
## IP Data

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← Conceptual figure of the rotary reactor

## Response speed increases with the rotation speed



↑ Change over time of pH when acidic gas is introduced into an alkaline aqueous solution and the rotary reactor is operated at a given rotational speed

## Related Works

## Contact