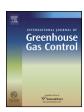


Contents lists available at ScienceDirect

## International Journal of Greenhouse Gas Control

journal homepage: www.elsevier.com/locate/ijggc



### Review

# Carbon dioxide absorption into promoted potassium carbonate solutions: A review



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#### ARTICLE INFO

#### Article history: Received 9 December 2015 Received in revised form 8 July 2016 Accepted 12 July 2016 Available online 30 July 2016

Keywords: Potassium carbonate (K<sub>2</sub>CO<sub>3</sub>) Carbon capture Promoter Absorption

#### ABSTRACT

The emission of carbon dioxide into the atmosphere is recognized as a significant driver for climate change. Carbon capture and storage (CCS) techniques are efficient and effective ways to reduce these emissions to the atmosphere. However, the cost of any carbon capture technique has to be reduced to manageable levels before it can be deployed at an industrial scale. Several methods for capturing carbon dioxide, such as absorption, adsorption, membrane techniques and cryogenic separation have been proposed, of which absorption is the closest to commercial reality. Potassium carbonate is a good solvent for carbon dioxide capture because of its low regeneration energy, low degradation rates and low corrosivity. However, one shortcoming of potassium carbonate in CO<sub>2</sub> absorption is that it has relatively slow reaction kinetics with CO2 resulting in the need for large absorption equipment. The most efficient method for improving the absorption kinetics is to add promoters into the potassium carbonate solutions. There have been a number of promoters studied over the last decades, including inorganic promoters such as arsenate, boric acid and vanadate, organic promoters such as different amines and amino acids, enzymatic promoters such as carbonic anhydrase and metal compounds mimicking carbonic anhydrase. In this paper, different promoters for CO<sub>2</sub> absorption in potassium carbonate solutions are reviewed and their performance summarized. Additionally, a CO<sub>2</sub> hydration promoting mechanism of deprotonation, followed by intermediate formation and then promoter regeneration is presented.

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