**Response to reviewers**

**Reviewer A**

1. Abstract

The experiments results showed that 500 oC for 5 h was enough to make magnesite slag decompose to MgO, with CO2 optimal adsorption capacity 3.01 mmol/g under the adsorption condition of 80 oC, 0.8 Mpa, 150 mL/min flow rate, which was reduced to 2.18 mmol/g after 8 cycles, indicating that the adsorbent has excellent CO2 adsorption performance and cycle stability.

Sentence could be removed to the conclusion, and replased by description sentence without optimization conditions.

**Answer:**

2. Introduction

In sentence

Therefore, in this study, we investigated magnesite slag as adsorbent for CO2 capture in the presence of water vapor, including optimize adsorption conditions, adsorbent recycling.

Use passive.- replase with magnesite slag as adsorbent for CO2 was investigated….

**Answer:** The sentence has been changed to “magnesite slag as adsorbent for CO2 capture was investigated in the presence of water vapor.”.

3. CONCLUSION

Sentence

By investigating the effect of calcination temperature, calcination time, adsorption temperature, flow rate and pressure on CO2 capture, CO2 capacity 3.01 mmol/g was achieved under the condition of calcining magnesite slag at 500 oC for 5 h, adsorption temperature, flow rate and pressure 80 oC, 150 mL/min, 0.8 Mpa. After 8 cycles, the CO2 capacity kept 2.18 mmol/g.

Is too long, rewrite.

**Answer:** The conclusion has been rewrite.

“The experiments results showed that 500 oC for 5 h was enough to make magnesite slag decompose to MgO. CO2 adsorption capacity 3.01 mmol/g was achieved under the condition of 80 oC, 150 mL/min, 0.8 Mpa, and reduced to 2.18 mmol/g after 8 cycles.”.

**Reviewer B**

Very similar data has already been published by the same authors in Journal of the Taiwan Institute of Chemical Engineers 86 (2018) 73–80. The experimental setup is the same and the methodology of the investigation is also the same. In previous paper the MgO based adsorbent was obtained by magnesite calcination and in this paper by magnesite slag calcination. Yet, the above mentioned previous paper has not been referenced in the current submission, nor has any comparison been made with the previously published data. Therefore, the Reviewer`s suggestion is Major review. The authors should completely rewrite the paper and draw the adequate conclusions with clear comparison with previous work. Especially the novelty of the current research should be emphasized.

**Answer:** Thanks for the reminding provided by the reviewer. The previous work has been added as reference 22. We investigated the CO2 adsorption performance by magnesite in previous work. Thus, we proposed if the slag could be used in CO2 capture, as it was a kind of wastes and also contained MgCO3. As the result, it exhibited better CO2 adsorption performance. The obvious difference and advantage of this paper from the previous work lies that not only CO2, but also a waste are processed. We intended to compare magnesite and magnesite slag in one paper, so the experimental setup and the methodology of the investigation were the same. However, the optimal calcined condition and adsorption condition of magnesite and magnesite slag were different, and the dates were too much to put in one paper. As the previous work has been published at the moment, it should be added in this paper. Thanks for the reminding again.

In “*The influence of calcination temperature and time*”

In our previous work, the magnesite for CO2 capture was calcined at 550 oC for 4 h, and the CO2 adsorption performance also decreased with the temperature higher and the time longer22. The reason are similar and due to that sintering can occur easily if calcination temperature is too high or time is too long, leading to BET surface area reducing and the pore structure destroyed, which hinders the diffusion of CO2 in the sorbent particles and decreases the CO2 adsorption capacity and efficiency24, which is also the reason that the CO2 capacity declines with calcination temperature rising.

In “*The influence of adsorption pressure*”

Magnesite was investigated in our previous work, and achieved 1.82 mmol/g CO2 capacity under the adsorption condition of 60 oC, 0.4 Mpa, 100 mL/min 10% CO2 flow rate in the present of water vapor22, indicating that the slag as a waste, has more advantages in CO2 capture.

In “CONCLUSION”

Applying magnesite slag in the CO2 capture is a new and simple method that can not only reduce CO2 emission, but also comprehensively utilize industrial waste residue. The experiments results showed that 500 oC for 5 h was enough to make magnesite slag decompose to MgO. CO2 adsorption capacity 3.01 mmol/g was achieved under the condition of 80 oC, 150 mL/min, 0.8 Mpa, and reduced to 2.18 mmol/g after 8 cycles. All the results indicated that the calcined magnesite slag had good CO2 adsorption performance and stability, and was a promising adsorbent for CO2 capture from wet flue gas. Compared to the previous work, the slag as a waste, has better performance on CO2 capture. However, for industrial application, the future work needed to be done should be focused on the effect of NOx, SOx and others in flue gas on CO2 adsorption performance of calcined magnesite slag.