Response to Reviewers

Reviewer A

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| Number | Comments | Correction |
| 1. | In abstract section, First include the full form of  FTIR, SEM, and TGA-DTG etc. | The abstract was restructured and the characterization was explained. (Line 16-27) |
| 2. | Which type of adsorption is a better fit for CO2 adsorption? Chemisorption or  Physisorption and why? | Based on the best fits adsorption kinetics model, the CO2 adsorption signifies a monolayer adsorption  phenomenon that exists referring to chemisorption between CeO2 impregnated AC and CO2. The presence of CeO2 provides the active site by allowing exchange electron and forming carbonate species. As a result, CO2 held firmly at the equilibrium state compared to AC. Nevertheless, the presence of physisorption still undeniable due to the adsorbent is AC based material which may form Van der Waals forces with CO2. (line 438-444) |

Reviewer B

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| Number | Comments | Correction |
| 1. | discuss the previously reported work to show the importance of chemical activation. | Previously reported works with the same application of CO2 capture were included in the article by stating the significance of chemical activation giving addition to the oxygen-containing functional group and toward the enhancement of the textural properties of AC. (line 350-358 and 231-234) |
| 2. | Kinetic studies analysis: The experimental results included in this section must be more detailed interpreted. | Most of the suggested articles are not similar to CO2 capture. This work only discussing adsorption kinetics but not inclusive thermodynamic and adsorption isotherm models. The explanation was added to some of the analysis with the aid of the equation of chemisorption.  (line 301-328) |
| 3. | Explain how the paper differs from others | This study is working on double activation of AC by using KMnO4 to obtain a better surface functional group and higher CO2 adsorption capacity from other works. In the CO2 capture studies, not all articles provide the desorption properties of the adsorbent. The recyclability test was included to explains the CO2 capture stability at different temperatures. (line 231-234, 316-317, 388-400) |
| 4. | Include a table for the comparison of maximum adsorption capacity using different adsorbents. | The summary for similar works by using chemical activation and metal oxides and other adsorbents were compared through the table in the introduction and the results. (line 109-121, 137, 344-348, 367) |
| 5. | What are the currently CO2 capture methods/treatments? What is the performance of these methods/treatments? | The most mature CO2 capture technology by using the amine solvent was stated in the literature review. The evolution of the technology was developed through the modification of the amine-based sorbent, deep eutectic solvent-based material, ionic liquid-based material. The performance was tabulated in the introduction. (line 109-121) |
| 6. | How did you select the ratios of MO/AC? | The ratio of 0.1 M MO toward the AC was chosen based on the results from other works which not yet been published. |