

Point-by-point response to the comments of Editor

- Comments:** Line 14: Add % after 1.76 ± 0.06 ;

Response: Thanks for this comment and point out my mistakes.

Changes in manuscript:
(Line 14) " $1.76\pm 0.06\%$ for Yangshanchong and $1.36\pm 0.01\%$ for Shuimuchong".
- Comments:** Line 12: Repetitive: ^{13}C -labeled CO_2 was evaluated using ^{13}C isotope;

Response: Thanks for this comment and point out my mistakes. And the sentence has been rewritten.

Changes in manuscript:
(Lines 11-13) "In this study, carbon sequestration in two samples of mine tailings treated with FeS_2 was evaluated using ^{13}C isotope, pyrosequencing and DNA-based stable isotope probing (SIP) analyses to identify carbon fixers."
- Comments:** Line 18 *Sulfobacillus* (8.04%) and *Novosphingobium*(8.60%) dominating in which site? And changes from xxx?

Response: Thanks for this comment and point out my mistakes. And the sentence has been readjustment and rewritten.

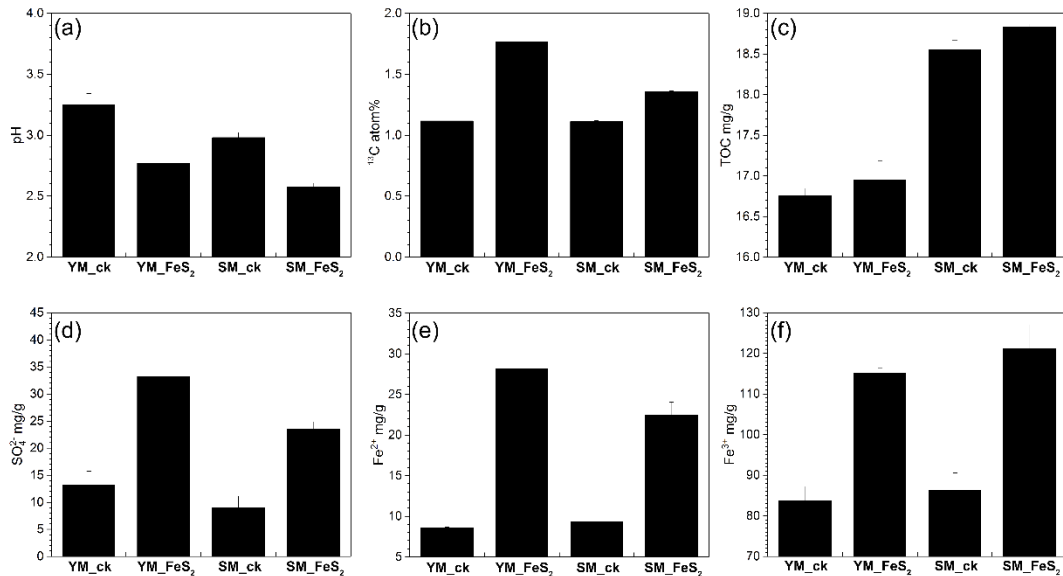
Changes in manuscript:
(Lines 15-18) "which emphasized the role of autotrophs in carbon sequestration with pyrite addition. Pyrite treatment also led to changes in the composition of bacterial communities, and several autotrophic bacteria increased including *Acidithiobacillus* and *Sulfobacillus*. And pyrite addition increased the relative abundance of dominant genus *Sulfobacillus* by 8.86% and 5.99% in Yangshanchong and Shuimuchong samples, respectively."
- Comments:** Line 175 you can not say "duringthe pyrite oxidation process", as the samples were collected at one time point.

Response: Thanks for this comment and point out my mistakes. And the sentence has been readjustment and rewritten.

Changes in manuscript:
(Line 177) "3.2 Bacterial communities in mine tailings under FeS_2 addition"
- Comments:** Fig. 1b ^{13}C should be ^{13}C

Response: Thanks for this comment and point out my mistakes. And figure has been redrawn.

Changes in manuscript:



6. **Comments:** In the end, I still doubt TOC can be increased as $0.20 \pm 0.11 \text{ mg/g}$ in just 14 days. Please give some support (literatures, proposed mechanisms, etc) in the section of "Discussion".

Response: Thanks for this comment and point out the doubt. And I also confused by this data. In fact, the change of this data is very little. And both the soil acidification pretreatment before analysis and the addition of 20% FeS₂ in samples could increase the error. Therein, for the TOC in YM_FeS₂ and SM_FeS₂, the soil quality should be convert according to the addition of 20% FeS₂, which also could overestimate the increment of TOC. Thus this data should not be an absolute proof, and I also rewrite the sentence of increased TOC in abstract and conclusion. And the discussion also pointed out the opinion. Furthermore, I think the strict TOC increment in the acidification process of mine tailings must be used a long-term experiment.

Changes in manuscript:

Abstract: (Lines 13-15) "Mine tailings treated with FeS₂ exhibited a higher percentage of ¹³C atoms ($1.76 \pm 0.06\%$ for Yangshanchong and $1.36 \pm 0.01\%$ for Shuimuchong) than did controls over a 14-day incubation, which emphasized the role of autotrophs in carbon sequestration with pyrite addition."

Conclusion: (Lines 341-342) "Our results reveal higher ¹³C atom % values with the addition of pyrite than in controls after a 14-day incubation."

Discussion: (Lines 293-297) "Although the results showed that TOC content in mine tailings increased slightly under FeS₂ addition, the soil acidification pretreatment and the addition of 20% FeS₂ in samples could increase the error of TOC analysis and calculation. And a long-term field test should be used to calculate the TOC increment in the acidification process of mine tailings in the future. Even so, in this study, the ¹³C content in mine tailings increased significantly."