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Discussions

Interactive comment on "Inducing the Attachment of Cable Bacteria on Oxidizing Electrodes" *by* Cheng Li et al.

Cheng Li et al.

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We sincerely apologize that we did not how to reply comment formly. Now we submit our final response as instructed by the editor.

Comment from Reviewer #1: Can cable bacteria exchange electrons with electrodes? The manuscript is well written and gives clear messages. The research is well done. However, I am wondering what controls are used? Such as is there any electrode without polarization to see if the cable bacteria still grow. I believe discussion of control would critically improve the manuscript. I am wondering, what would happen the shape of the profiles (DO, S2-, and pH) if the polarization was stopped. Even without these controls, the manuscript is critically important to advance our knowledge of cable

bacteria. I believe, this manuscript will generate many new research questions.

Response: We thank the reviewer for such positive comments. Our experimental results showed that cable bacteria migrated out of sediments and attached to poised electrodes where they most likely contributed to measured currents, implying they can perform electron transfer to an electrode. However, since they were only part of a mixed-species biofilm we cannot say definitively that this experiment shows they can exchange electrons with electrodes. The complicated environment on the electrode surface (e.g. the deposited minerals and other types of electrode-associated bacteria) hindered such a certain conclusion.

In our experimental setup, one of the 3 electrodes inside of the anodic chamber was maintained at the open circuit as a control electrode (as is stated in the section on Reactor Configuration and Operation). Scanning electron microscopy showed that the surface of this control electrode surface stayed relatively clean without any filamentous bacteria biomass or mineral deposition (Fig. 6i). We did conduct profiling with microelectrodes in the reactor after the anodes were poised but, in the process, broke our pH microelectrode. The profiles of O2 and H2S were predictable due to the imposed anoxia and the presence of the anodes as a high-area oxidizing surface: dissolved oxygen was below detection in the overlying seawater and sulfide concentrations were also below the detection limit in overlying seawater but could be detected when the microelectrode entered sediment surface. We decided not to include this profile data because it was not very visual (zeros) and does not reveal what was happening on the electrode surface. When we dissembled the reactor, the seawater inside of the reactor had a pH near 6.2.

Changes in manuscript: This comment has given us a clear direction for the revision of our manuscript. We will revise the implication and conclusion sections to clearly state how the results from this study and other published research only indicate cable bacteria may exchange electrons with electrodes, and we will point out potential directions for upcoming experiments to observe definitively cable bacteria's electron transfer to

electrodes. We will also revise the Results and Discussion to give more information about microprofiling results in the closed reactors.

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