

Interactive comment on “Formation and origin of Fe-Si oxyhydroxide deposits at the ultra-slow spreading Southwest Indian Ridge” by Kaiwen Ta et al.

Anonymous Referee #2

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The paper “Formation and origin of Fe-Si oxyhydroxide deposits at the ultra-slow spreading Southwest Indian Ridge” by Ta et al. is a geochemical study of six Fe and Si rich samples from the SWIR, collected by various means between 2008 and 2015. Although the data appears well collected and analytical work is extensive and appears sound, the context of the paper, including the introduction, interpretation of results and discussion is jumbled, and there needs to be more discussion reconciling the different analytical results. For example, the low sulfur content (line 436) is inconsistent with the presence of pyrite as a major mineral (line 286); also none of these major minerals (line 286) represent phyllosilicates, stated as the most abundant Fe pool obtained by the leach procedure (line 340). Also, the Mössbauer shows exclusively Fe(III), however

C1

XRD reveals pyrite, Fe(II). The authors claim goethite and hematite are mineral phases (line 337-338), but do not see these via XRD. The paper does not address the possible reasons for these inconsistencies, and must.

The discussion is also internally inconsistent. For example, regarding the role of microbial activity in forming the Fe-Si minerals line 582 suggests “these findings support the hypothesis that microbial activity was the principal deposition mechanism of Fe-Si oxyhydroxides in modern and ancient seafloor hydrothermal systems” while line 494 notes microbes “were widely involved” and line 442 suggests that they “may have played a role.” The conclusions (line 584-585) and line 567-569 attempt to tie in the “origin and evolution of life” which isn’t discussed in the rest of the paper and seems to be a non sequitur to the rest of the manuscript. Additionally, the paper should be proofread for grammatical issues and other issues, for instance there is no “Mid Pacific Ridge”, the scale bars in Figure 8 are really not visible.

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C2