

Reviewer's #2

Major concerns:

“Article title”

->Please consider revising the title by reflecting the contents of the study. For example, there is no content of “dynamics” in this article but all the contents are rather static. You may also add some keywords specific to this study, for example, electron microscope and X-ray analyses.

Author s' response: We have revised the article title based on the reviewer's suggestion.

“Keywords”

->Please consider providing keywords that are not used in the article title.

Author s' response: We have provided the keywords that are not used in the article title.

“1. Introduction”

-Please consider focusing your introduction directly on your study and minimizing general background of artisanal gold mining.

Author s' response: We have minimised the general background of artisanal gold mining in the introduction section.

“2. Materials and Methods”

“2.1 Study area and general context”

- Please consider sending the information given in this section to introduction since all the information is literature review.

“2.2. Raw samples”

-Figure 1: Please consider removing this figure or add more information (e.g. geological map) there. The current figure does not have more value than the coordinates that can be written in the text.

Author s' response: We don't have the geological map because there are still no official studies since it is clandestine and unofficial mining. Therefore we have deleted Figure 1.

-Figure 2: Please consider explaining the figure. If you do not, please consider removing it.

Author s' response: We have provided explanation to the figure 2 in the manuscript.

-Lines 91-92: “...the collected samples were completely homogenized...”->Please consider mentioning how you homogenized your samples. Splitting? Quartering?

Author s' response: The samples were homogenized by cone and quartering technique.

“2.3. Analytical methods”

-In general, please consider (a) stating more details of the experimental procedure in this section and (b) introducing the equipment you used and showed the results in this article.

Author s' response: We have included the equipment used for the showed results.

For example, for SEM imaging, please consider stating the way you deposited your sample(s) in an SEM chamber, detector type (SE? BSE?), accelerating voltage, and working distance. Also, please consider explaining how you analyzed your images. Those information would be helpful for future researchers. This comment also applied to all the characterization methods introduced in this section.

doi.org/10.1016/j.actamat.2005.12.014

doi:10.3390/electronics8101202

Author s' response: We have included the method of depositing samples (BSE) in the SEM chamber in the section. In addition we have read and review the above journal articles and cited them in the analytical method section of the manuscript.

In this article, did you show the results you obtained with Raman, SAED, MBD? If not, please consider removing those phrases from this section.

Author s' response: We have removed phrases such as Raman, SAED and MBD in the section 2.2.

“3. Results”

-In general, please consider describing and discussing the results with a fair point of view. This comment also applies to the section “4. Discussion”. Please see my specific comments below.

-Lines 148-149: “...clay particles of 1 μm size and Fe-oxyhydroxides of 500 nm size were also detected.”->Please consider showing the images and SEM/TEM-EDS results in order to justify your statement.

Author s' response: Figure 3 shows 50nm of smectite group of clays and not 1 μm (0.05nm). We have effected change to the typo error.

-Figures 3-9: In the figure title, please consider stating the sample name.

Authors' response: Thirty nine (39) samples were examined. We obtained similar mineralogical and chemical compositions from the samples. Therefore, we decided to use those figure as representative.

-Figure 4: (a) In the figure title, please consider clearly mentioning the title for the main figure and sub-figure. (b) Please consider providing larger letters for mineral names and their equations.

Authors' response: We have provided larger letter for mineral names and their equations. In addition, we mentioned the title for main figure and sub-figure.

-Line 186: “...goethite.”->Please consider showing the results indicating the presence of goethite.

Authors' response: Result in Fig. 3 indicates Fe-oxyhydroxide which is comprised of ferrihydrite, crystallinities and goethite.

-Lines 197-198: “...a dynamic correlation...”->Please consider providing more details about a dynamic correlation identified from static images, or removing this phrase from the statement.

Authors' response: The phrase “a dynamic correlation” was removed from the statement.

-Lines 234-236: "Figure 6 illustrates the transformations of cubic and spherical pyrites into jarosite..."-
>Please consider providing the support of your statement in addition to those images. Since the sizes of jarosite (about 10-20 nm) and pyrite (about 20 µm) are quite different, your statement is not so convincing.

Authors' response: We have indicated the sizes of detected pyrite and jarosite in the sentence (Lines 234 – 236).

-Lines 238-239: "...the EDSs analysis revealed that different types of PHEs, including Cd, Hg, Ti, and Sr were also found..."->Please consider showing your results indicating this point.

Authors' response: We have shown EDS results in Fig. 8 indicating this point.

"4. Discussion"

-Figure 8: (a) "Figure 8: Typical pure hematite containing a minor portion of aluminosilicates."-
>Hematite containing a minor portion of aluminosilicates? Pure hematite should not contain other minerals? (b)"Figure 8...containing...aluminosilicates."->Please consider stating your justification of the presence of aluminosilicates. From your EDS results, there is no strong evidence of the presence of aluminosilicates. (c) Please consider pointing out which point or area within the image you bombarded X-ray for EDS analysis. (d) In case, you did SEM-EDS analysis, please clearly mentioned it in the figure title and there is no proof of the presence of aluminosilicates in the hematite imaged under TEM since the spatial resolution of SEM-EDS is larger than several µm and impossible to match your TEM image in 10 nm with SEM-EDS results obtained in larger than µm order.

Authors' response: We agreed with the opinion of the reviewer that there is no strong evidence that support the presence of aluminosilicate (lack of Si in the EDS result). We have effected the suggested changes in the figure title and under results section.

-Figure 9: Please consider removing this figure as there is no justification of fixation of Hg by the Fe-nanominerals unless you have point elemental analysis within these specific mineral particles/aggregates.

Authors' response: We have removed Fig. 9 as suggested by reviewer in the manuscript.

"5. Conclusion"

-In this section, please consider providing the good summary of your study in agreement with the results presented in the article.

Authors' response: We have revised the conclusions section to reflect significant results of the study.

-Lines 325-326: "The results showed that the amount of As, Hg, and Zn were highest in the clay particles."->Please consider revising this statement as you did not inform the amount of those elements in this article.

Authors' response: We have revised the statement as requested by the reviewer.

Minor concerns:

-Please consider polishing English more. You may use some of my comments above for this purpose.

Authors' response: We have improved on the English through editing and proofreading of the manuscript by English natives.