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To: Oleg Korablev, Associate Editor, Geoscientific Instrumentation
From: Aaron Jubb
Date: October 10, 2023
RE: Reviewer comments for manuscript #egusphere-2023-2146

Title: Feasibility of cell-phone camera Raman spectrometer for geological samples identification in field or mobile situations

Authors: Dinesh Dhankhar and Matthew Wehner

This note describes the use of a cell-phone Raman spectrometer for geomaterials analysis. The major selling point of this approach is the democratization of access to a Raman spectrometer as the cell-phone modification is relatively inexpensive (<$500). While I found myself genuinely interested in this approach, the data presented is very limited and the discussion focuses more on hypothetical uses of the approach in place of a critical evaluation of the spectrometer's strengths and weaknesses for geomaterials analysis. The note's presentation is more in-line with a technical product note as one would find on a scientific instrument manufacturer's website instead of a research article. Major revisions, as detailed below, are needed before this is appropriate for publication.

Best,

Aaron M. Jubb, Ph.D.
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Recommendation: Major Revision

Major Revisions

1. Spectra are shown for hand samples of gypsum, calcite, and diamond. However, most geologic materials typically analyzed by Raman spectroscopy are spatially heterogeneous. How do the author's propose to measure samples where multiple phases are present in the probe spot? Or where one phase is the analytical target instead of adjacent phases? This article would benefit from the addition of data from geologically heterogeneous samples along with a discussion.
2. As I alluded to above, the discussion focuses on several potential applications (e.g., fluorescence) for the spectrometer without inclusion of any data. Inclusion of data toward this end will greatly bolster the discussion, which currently is speculative.
3. The cost estimates for the parts are overstated. For instance, the abstract states the cell phone modification is only ~$50, but as of 9/28/23 the dichroic mirror (Thorlabs part number DMLP550T) used was listed as $131.61. I suggest addition of a table with each part needed for the modification, the manufacturer, the price and the date purchased. This will provide context for readers interested in potentially attempting to make this modification to a cell-phone.
4. Provide actual citation to RRUFF database: Lafuente, B., Downs, R.T., Yang, H., Stone, N., 2015. The power of databases: the RRUFF project. In: Highlights in Mineralogical Crystallography, T. Armbruster and R. M. Danisi, eds. Berlin, Germany, W. De Gruyter, pp. 1-30.
5. Finally, more of an aside than a revision, but distinguishing between organic and mineral fluorescence, in my experience, is non-trivial. The authors are encouraged to carefully consider the discussion on Lines 117-127 and whether their cell-phone Raman spectrometer could accurately distinguish between organic and mineral fluorescence.