

Review of “ON-LINE DIFFERENTIATION OF MINERAL PHASE IN AEROSOL PARTICLES BY ION FORMATION MECHANISM USING A LAAPTOF SINGLE PARTICLE MASS SPECTROMETER” by Marsden et al.

The authors present a novel way to qualify minerals in single aerosol particles by type based on what seems to be reproducible matrix effects particular to the different mineral types. Although the manuscript could use a good proofread (see technical corrections below for some examples) it could also be expanded to note the reproducibility of these measurements. For instance it is unclear how sensitive the matrix effect is to various instrument parameters. Would the effects be particular to just the instrument in question or is it reproducible between instruments by the same manufacturer or between various aerosol mass spectrometric instruments. Without this information the applicability of this technique to the broader aerosol community is limited. However, if the method is indeed robust then this manuscript provides a step toward speciating aerosol particles by their mineral type. Finally the authors must address the real world applicability of this technique by including data on ambient aerosol if possible from a well-defined source. Real world data tests the limits of any instrumental procedure and can reveal how changing temperature, humidity, organic aerosol coatings, and heterogeneity in aerosol type, could affect the qualitative analysis presented in this paper. Any data that speaks to dependence of results on environmental parameters should be mentioned. At the end of the day this is a good manuscript worthy of publication so that others can help determine the extent to which this technique might be practical in a real world setting.

Other Major Corrections:

Pg 8 Ln 8-14. Can you speak to humidity effects on your measurements? does varying absolute humidity in the dust tower yield different results or matrix effects? Also the source of compressed air (company, and purity grade, water content) should be mentioned in the text

Pg 10 A couple of IGOR files/macros are mentioned however these seem to be homebuild analysis routines, The reader has no basis to judge the validity of these routines and thus they should be explained as to their function a bit more extensively, and/or code should be included in the supplemental if this hasn't already been done.

Pg 10 Define what is mean by “number of smoothes” and how the smoothing function works.

Pg 12 Ln 3 Why are the resolution of the TOF around the same resolution as a quadrupole mass filter. I would expect resolution of TOF to be in the 4000-5000 range. Please comment on the lack of resolution for your instrument

Technical Corrections:

Pg 2 Ln 17 rephrase “The role of a mineral dust particle in the atmospheric processes...” to “The role of mineral dust particles in atmospheric processes”

Ln 20: remove “recently” as the articles cited are over 10 years old

Ln 24: need a closing parenthesis in the year 2010

Pg 3 Ln 9 define “NX” in “NX powder”

Pg 4 Ln 1 Be consistent with TOF-MS or TOFMS throughout the paper

Ln 18 change “markers ions” to “marker ions”

Pg 5 Ln 2 Be consistent with illite–smectite vs illite/smectite throughout the manuscript

Pg 10 Ln 11 please rephrase the sentence starting in “The ion...”

Figure 3 – please use a higher resolution image.

Figure 6 – reformat axis labels to be more readable

Pg 17 Ln 19 – remove “Error!...”

Pg 18 Ln 9 – remove extra space before the period.

Figure 9 – revise to clearly see the difference between the symbol types in part a. In part b there is a typo on the y-axis label. General quality of this figure needs to be improved upon.
Pg 23 Ln 20 revise for readability