

## ***Interactive comment on “The ToF-ACSM: a portable aerosol chemical speciation monitor with TOFMS detection” by R. Fröhlich et al.***

### **Anonymous Referee #2**

Received and published: 18 September 2013

Presented in this manuscript is an economy time-of-flight aerosol speciation monitor (ToF-ACSM) designed for long-term, low maintenance operations. This instrument is built upon the successful AMS technology and represents a significant improvement over the current Quadrupole ACSM. Compared to the Q-ACSM, the ToF-ACSM is capable of monitoring NR-PM species with better sensitivity and chemical resolution. These improvements are important for understanding atmospheric aerosol chemical composition thus their sources and processes. The measurement data from a 10-month deployment at a high elevation site are also presented. The results clearly demonstrate that this instrument is successful. This work is significant and the content is suitable to publish on AMT. I recommend acceptance for publication after the authors respond to the following comments.

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Reorder the figures so that they are presented in the text sequentially.

Page 6772, Line 24, an aerodynamic lens with larger size cutoff is mentioned, has it been tested on the ToF-ACSM?

Page 6774, line 3, give a bit more information about the flange.

Page 6774, Line 22-23, check the grammar of this sentence.

Page 6778, line 8-9, the quoted variations in the RIEs of NH<sub>4</sub> and SO<sub>4</sub> are quite large for the same instrument. Is there information about why they change so much? From a practical point of view, if large variations were observed between two calibrations, how were RIEs applied to determine NH<sub>4</sub> and SO<sub>4</sub>?

Page 6778, line 10 -11, the purpose of analyzing (NH<sub>4</sub>)<sub>2</sub>SO<sub>4</sub> particles is to determine the RIE for sulfate. It is unclear why one should know the size and concentration of (NH<sub>4</sub>)<sub>2</sub>SO<sub>4</sub> particles to determine the RIE for sulfate?

Page 6778, line 20, is the size D<sub>m</sub> or D<sub>v</sub>?

Page 6880, Line 10, is t in the unit of second?

Fig. 1. What's the broken green line?

Fig. 3, check the figure caption, some descriptions are inconsistent.

Figure 8, the correlations between the two ACSM are systematically better than those between ToF-ACSM and C-ToF. Is there some fundamental reason for this? Could it be due to difference in instrument designs between ACSM and a regular AMS?

Fig. 9, I am not convinced that the separation of C<sub>2</sub>H<sub>3</sub>O and C<sub>3</sub>H<sub>7</sub> is quantitative. Can the authors show the diagnostic time series of mass accuracy and resolution?

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Interactive comment on Atmos. Meas. Tech. Discuss., 6, 6767, 2013.

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