Atmos. Chem. Phys. Discuss.,
https://doi.org/10.5194/acp-2019-636-RC2, 2019

Atmospheric Chemistry and Physics Discussions

Interactive comment on "High secondary formation of nitrogen-containing organics (NOCs) and its possible link to oxidized organics and ammonium" *by* Guohua Zhang et al.

Anonymous Referee #2

Received and published: 21 August 2019

This paper analyzed single particle aerosol mass spectrometer (SPAMS) data for ambient aerosols and found there are relations between CN-/CNO- ion intensities and some other species, such as oxidized organic ions and ammonium. It is an interesting report. But there are some concerns which need to be addressed before publication.

One of the major problems is that this paper attribute oxidized organics to secondary formation. However, it may not be the case. Biomass burning or coal combustion can also produce oxidized organics including large amounts of NOCs. Actually, in many previous single particle mass spectrometry studies, CN- and CNO- were taken as ion markers for combustion sources. The authors need to provide more evidences either

to rule out the possibility of primary oxygenated organics and primary NOCs or to distinguish the secondary organics from the primary ones.

Another major concern is that how well CN-/CNO- ions can represent total NOCs. Can they represent 25%, 50% or 75% of total NOCs? The paper needs to provide more discussion on this issue.

The third concern is that ammonium sulfate is very difficult to be ionized under 266 nm UV laser. Thus, it is likely that some mass spectra of particles do not contain NH4+ peak but these particles may still contain ammonium sulfate. The authors also need to provide some discussions on this possibility.

Specific comments:

Line 54: how much is "large"? It would be always better to provide a number or range.

Line 149: "so on" is a bit informal. I would change "so on" to "so forth"

Line 220: How do you come up with this statement: "...explain over half of the observed variations in NOCs in the atmosphere of Guangzhou."? Please elaborate and provide more details.

Line 224: Please report if the PMF analysis reaches convergence or not. How much is the error of the PMF modelling in the paper?

Line 387: Check English

Interactive comment on Atmos. Chem. Phys. Discuss., https://doi.org/10.5194/acp-2019-636, 2019.