Atmos. Chem. Phys. Discuss.,
https://doi.org/10.5194/acp-2018-53-RC1, 2018

Atmospheric Chemistry and Physics Discussions

Interactive comment on "Characteristics and mixing state of amine-containing particles at a rural site in the Pearl River Delta, China" *by* Chunlei Cheng et al.

Anonymous Referee #1

Received and published: 4 February 2018

This manuscript reports the mixing states of particulate amine in ambient environment using a single particle mass spectrometer. The most interesting observation made in this work is the large quantity of amine-rich particles but poor in ammonium which suggests the importance of the displacement of ammonia by amine. This observation also suggests that amines and aminiums should be considered when calculating the particle acidity. I believe this is a very important observation. The manuscript could be accepted by ACP if the authors could provide more detailed discussions to support this major conclusion. 1. Line 192-205 and Part 3.2: The mass spectral patterns of ECOC and BB particles were almost identical. The size distribution and the temporal variation were also similar. In Part 3.2, no further discussion on the differences of these two

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particles types. What's the reason or necessity of this kind of classification? 2. Line 220-222: What are the different trends? High concentration amine showing on different days are not trends. 3. Line 225-234: The authors claimed that no obvious correlation between amine particle counts and RH in this work. However, both summer and winter diurnal variations showed higher counts at night. Did this diurnal pattern correlated with diurnal RH variation? 4. Line 259-263: Since this is the most important observation in this work, I strongly suggest that the author should also examine the ammonium-containing particles separately and compare with the amine-containing particles to see the differences in number fraction and temporal variation. 5. Line 283-286: More discussions should be given on the assignment of the marine source. The observed amines could be the results of secondary partitioning since the primary amines could have aged during the long-distance transport. I would suggest some detailed analysis on the other nitrate-rich particles with no sea salt mass patterns to see the differences in amine signals. 6. Line 340-342: How similar? Any correlation coefficient? 7. Line 362-364: High water content or particle acidity could also attract more ammonia to the particle phase considering the much higher concentration of ammonia in ambient environment (one or two magnitudes higher than those of amines). The authors should give more detailed discussions on the formation mechanism of these amine-rich but ammonium-poor particles. Discussion on ammonia and amine sources around sampling site is also necessary to exclude the special sources of amines. 8. Figure 1: This figure shows the spatial distributions in different seasons, not the seasonal distribution of amines.

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