

Dear Prof. Barbara Ervens,

The authors are grateful for the Editor Comments. These comments are very helpful for us to improve our manuscript. We would thank everything you did in handling this manuscript. We will respond to the comments point-by-point.

Best wishes,

Yang Chen, on behalf of all authors

Editor comments

l. 36: ‘...that amines were undergone uptake by particles’ should be replaced by ‘that amines were taken up by particles’

Accepted and changed.

l. 71/72: I think Referee #1 criticized this sentence because of its structure. I suggest removing it.

Accepted and changed.

l. 72 – 82: This discussion of previous results is very brief. Add some more details in order to make it a useful comparison to your work: (Dall'Osto et al., 2013)

- Which particle types were found in Barcelona?

In Barcelona, five unique types of amine-containing particles were observed, including *amine-POA58* (composed of amines, sulfate, and nitrate), *amine-EST84*(environment tobacco smoke), *amine-SOA59* (composed of TMA and organics), *amine-SOA114*, and organic nitrogen amines (Dall'Osto et al., 2016; Dall'Osto et al., 2013).

- Why were TMA particles in Guangzhou important?

In Guangzhou, TMA-containing particles were important, taking up to 7% in number fraction during clear days and 35% during fog events (Zhang et al., 2012).

- Did Zhang et al find TMA formation in fog? (It is not clear what ‘similar scenario’ refers to.)

Zhang et al. found that, during fog events, the number fraction of TMA-containing particles took up to 35%; in size range of 0.5-2.0 μm , the fraction accounted up to 60% (Zhang et al., 2012).

We have improved this part, please see line 74-86.

l. 110: remove 'yielded'

Accepted and changed.

l. 121-123: The sentence is still not clear. What are duplicate particles? 'Query results' is not clear either.

Please see the revised version (Line 125-129):

The query strategy resulted in duplicate particles in the result when various amines co-existed in one single amine-containing particle. After the duplicate particles were removed from the multiple query results described above, all amine-containing particles were combined into an amine-containing particle cluster.

l. 134/135: This sentence is not clear: Do you mean: 'The RPA of DEA for each particle type was first calculated from all particles'? Please clarify.

There are two steps for calculating the RPA of DEA: the RPA of DEA were extracted in each particle, then the extracted RPAs were summed up.

Please see the revised version (Line 140-141):

To calculate the overall RPA of DEA, the relative peak areas of DEA in each particle were extracted and then summed up.

l. 140: Do you mean '...accounting for 70% and 78% of all amine-containing particles in winter and summer...'?

Yes, we have changed that. We would thank the Editor for the clarity (Line 146-148).

l. 147: remove 'mixing'

It has been changed.

l. 163/164: I think this sentence ('Seasonal variations ...') can be removed here as the discussion of the unscaled size distribution starts only in l. 176.

The sentence has been removed.

l. 217: Only the left panel in Figure 3 shows wintertime results. If you refer to Figure 3a, you should add 'a)' and 'b)' to the Figure, respectively.

The reference of Figure 3a and b belonged to an old version; we have changed this to Figure 3 (Line 223).

l. 252: Remove 'In addition'.

It has been changed (Line 258).

l. 271: It is not clear what you mean by 'this kind of discussion'.

We have changed it to "the effect of RH on aerosol chemical processing." (Line 277-278)

l. 281-283: Remove this new sentence as it is already in l. 132. You can refer here simply to Section 2.3. (Even though I don't think it is necessary at all.)

We agree, and the sentence has been removed.

l. 299-301: As Referee#2 stated correctly, you cannot make any assumption on aerosol water content and pH since you analyzed dry particles. Thus, the new sentence does not make much sense.

In this study, the relative acidity of amine-containing particles ((sulfate + nitrate)/ammonium, (Yao et al., 2011)) was in a range of 20-150, providing favorable conditions for the dissolution of DEA.

Indeed, due to the nature of SPAMS, the amount of aerosol water content and pH were unavailable, making it difficult for further analysis.

as follows (or similar):

As particles are dried in the SPAMS, the amount of aerosol water content and pH were unavailable.

The values of the anion/ cation ratio ((sulfate + nitrate)/ammonium, (Yao et al., 2011)) were in a range of 20-150 suggesting that the particles might have been acidic which favors the dissolution of

DEA.

Yes, we have replaced the map in the SI.

l. 309: remove 'content'

We have changed (Line 313).

l. 342: replace 'OC' by 'organic'

We have changed (Line 346).

Supporting information:

- Use the updated manuscript title on the first page

Yes, we have changed this part.

- Change 'Table 1' to 'Table S1'

Yes, we have changed this part.

- Figure S1: This map is not very useful. The first panel does not show any contrast and, thus, does not give any information. I suggest adding a map that shows the location of the sampling site within China and the larger region. If you have a satellite image with high resolution, it might be useful to add to show the topology, together with a scale.

We have changed the map of the sampling site.

References

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Zhang, G., Bi, X., Chan, L. Y., Li, L., Wang, X., Feng, J., Sheng, G., Fu, J., Li, M., and Zhou, Z.: Enhanced trimethylamine-containing particles during fog events detected by single particle aerosol mass spectrometry in urban Guangzhou, China, *Atmos Environ*, 55, 121-126, 10.1016/j.atmosenv.2012.03.038, 2012.