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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Campholenic aldehyde ozonolysis: a possible mechanism for the formation of specific biogenic secondary organic aerosol constituents" *by* A. Kahnt et al.

Anonymous Referee #1

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General Comments

This paper describes the detailed characterisation of the SOA composition formed from the ozonolysis of campholenic aldehyde, which is an oxidation product of a-pinene, a major BVOC emission. The paper is easy to read and well laid out. The figures, including the mass spectra, are clear and the mechanisms are instructive. The structural interpretation looks correct and the authors are careful not to draw firm conclusions where the spectra are not consistent. The rearrangement for the m/z 335 ion is rather odd, but I cannot find any evidence that this is not plausible and the MS3 of the m/z171 peaks does seem to support the formation of the terpeneylic acid fragment ion. These

sorts of papers may seem to be rather technical and analytical in nature, but they provide very useful information about atmospheric chemistry and allow the identification of tracer compounds in the ambient aerosol samples. Therefore, I feel this paper should be published in ACP after the minor corrections and comments below are addressed.

Specific Comments

Title: The title is a bit vague and rather long. Also, I don't think the "possible" is really needed.

Page 22489, line 10: Insert "the prevailing"

Page 22491, line 13: Would be clearer as "composition of the inorganic salt solutions used"

Page 22491, line 25: Remove "added"

Page 22492, line 12: I don't think moisturised in the correct word. I think you can just say "was purchased as a 50 % solution in water". Also is the v/v or w/w?

Page 22493, line 16: The filters were baked out at 105 C. This seems very low. Are the filters sufficiently blank with this pre-treatment method?

Page 22494, line 21: Replace "," with "and" after reagent

Page 22495, line 13: Remove the "also"

Page 22499, section 3.3.1: This section is rather confusing. You start talking about a single compound and then mention lots of other ions and how you interpret the data. I think the whole section from line 23-29 needs to be before the start of section 3.3.1 i.e. in 3.3

Page 22500, line 17: For completeness, it might be prudent to include a sentence stating that this product is not identified at present

Page 22502, line 8: This wording is not clear.

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page 22503, line 4: Replace “could thus be” with “was”. Line 21: Swap round to be “both appeared”

Page 22504, line 14: There is not discussion here about the fact that this peak really is very minor in the a-pinene and k-puszta samples. I think there could be more discussion, either here or in the conclusions about why some peaks are very prominent in the ambient samples and some are not.

Page 22504, line 24: The sentence starting “these highly functionalised. . ..” Is unclear, I am not sure what your point is.

Page 22505, Replace “enabled to explain” with “could be used to explain”

Table 2: I think the CO should be in brackets. It looks like one formula

Table 3: There is a 541a but no b

Table 4: For the hydrazones 381a-c, it is not clear which peaks the two structures relate to. Just a spacing issue

Table 5: Why are no product ions given for terpenylic acid?

Figure 2a: What does the shaded area represent?

Figure 2b. The molecular formulae are very hard to read

Figure 6: You do not mention the very different intensities in the text. Why are they so different?

Supporting info:

Figure SI-1: Is the peak in k-puszta a single compound or co-eluting ones? It is very large in comparison to the very small peak in the a-pinene SOA

Text under SI-12: “e” missing from diverse

Text under SI-15: remove the “also” after Nevertheless

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Section 1.7: This m/z is not mentioned in the main text. It is rather strange to discuss it here, when it is not in the actual paper. The last line is unclear. I think you mean “have different chemical structures”? Also, in Figure SI-19, why is the k-puszta chromatogram not scaled to 100%? The peak is tiny and I wonder if it is actually very relevant? But if you scaled it 100% the reader could determine the size of the peak compared to the raised baseline.

Figure SI-25: Do you think the a-pinene SOA and k-puszta MS2 are from a different compound than the campholenic aldehyde SOA or is it that 2 compounds are overlapping in those samples? Since the MS3 data look similar, the latter seem very plausible. This section needs some sort of conclusion.

Interactive comment on Atmos. Chem. Phys. Discuss., 13, 22487, 2013.