

Interactive comment on “Partially oxidised organic components in urban aerosol using GCXGC-TOF/MS” by J. Hamilton et al.

J. Hamilton et al.

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We would firstly like to thank the reviewers for their comments.

One of the main points to come out of the reviews was that only one sample was analysed. This was misleading in the text. We have analysed a total of 20 samples collected during both winter and spring months. We have shown the chromatogram obtained for a single sample only, as an example. Rather than show the abundance ratio of this single sample only, the table has been amended to show the range of ratios obtained for all the samples analysed. In addition, any compounds that were also found in the blank edge filter chromatogram have been highlighted in italics, as they may not be associated solely with the aerosol phase. The ratios for nonane and decane have been replaced with dodecane and eicosane as these have been better characterised in urban aerosol. The meteorological conditions for the sample chromatogram have also been included.

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The description of the thermal desorption stage of the analysis has also been amended. The cooled GC inlet was at 40 C. The initial in-inlet desorption was slow, 40–300 C at 20 C min⁻¹, in order to minimise thermal decomposition and reactions. The secondary ballistic heating was from the liquid nitrogen temperature to ambient temperature, i.e. -175 to 20 C. The word ballistic has been removed and a more detailed description has been given. We feel that the slow thermal desorption step minimises any possible chemical reactions within the organic aerosol and reduces the possibility of artefacts during analysis.

The claim in the abstract that there is good agreement between measured species in the urban samples and smog chamber experiments has been further elucidated in the discussion section. The main analytes discussed in this paper are the cyclic oxygenates, in particular the furanone and furandione type compounds. These compounds have been measured in the gas phase of numerous aromatic smog chamber experiments, including Smith et al., 1999 and Calvert et al., 2002. The aerosol phase composition from these aromatic smog chamber experiments however is still very poorly understood with the results from Forstner and Jang and Kamens being contradictory. However, we have found many of the compounds identified by Forstner in aerosol from aromatic oxidation experiments and also those known to be in gas phase. We cannot however, in this paper give a detailed discussion on the differences in aerosol composition found in others work.

Specific comments: Referee 1 The filters were stored in the freezer until analysis, usually between 2 weeks and 6 months after collection.

The group trends in figure 1 were determined using a series of standard mixtures and mass spectral data. The streaking seen in the chromatograms is common in GCXGC especially when polar compounds are released by thermal desorption. They are more pronounced when the chromatogram is viewed at high intensity.

A discussion of the similarity of our results to those of Welthagen et al has been added

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to the text. The GCXGC chromatograms are similar and contain many of the same groups. The Welthagen et al chromatograms have a region labelled polar and volatile in the top left hand corner of the contour plot, in which they have not identified the individual analytes. Using a series of standard mixtures, we have identified the species in this region as the oxygenated (primarily cyclic and aromatic) organic material, as indicated in the paper.

The footnote to table 4 has been amended and the font size of the table made consistent.

Referee 2 The claim of 10,000 individual organic compounds is the results of the analysis of numerous samples. In addition, a small explanation of the deconvolution software has been added. The software provides additional resolution of co-eluting peaks and greatly aids data analysis. The vast number of compounds resolved is one of the most important results of this work and we feel this should be stated in the abstract.

We have rephrased the P1394 L23 as suggested.

The low temperature of the modulator is approximately -160 C and this has been added to the text.

The description of the blank filter paper chromatograms has been moved to the experimental section.

P1403 L10 Hamburger has been deleted. L19 SOA has been defined. L28 references have been amended.

Interactive comment on Atmos. Chem. Phys. Discuss., 4, 1393, 2004.

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