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Atmospheric Measurement Techniques
Discussions
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Interactive comment on "Determination of alkyl amines in atmospheric aerosol particles: a comparison of gas chromatography-mass spectrometry and ion chromatography approaches" *by* R.-J. Huang et al.

Anonymous Referee #2

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General comments

This paper reports the evaluation of two different analytical methods (i.e., GC/MS and IC) for determination of low-molecular-weight alkyl amines in atmospheric aerosols. Because low-molecular-weight aliphatic amines is likely involved with particle nucleation as well as chemical transformation of particles, measurements of alkyl amines in various ambient environments are valuable in providing information on origins of organic aerosols. In this paper, the procedures for evaluation and optimization of the

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amine analysis are well organized. In my opinion, however, the manuscript lacks the analysis using the ambient aerosol samples in the evaluation and optimization of the methods. This is an important point because the analytical result from ambient aerosol samples is expected to be different in chemical mixture from that with authentic standards in laboratory experiments. Moreover, descriptions on IC peak assignments include much ambiguity and need to be clarified. I recommend its publication in AMT after some revisions raised below.

Specific comments

(1) P.2134, L.17-20: I cannot understand what “a spiked sample” is. The authors state that “real samples are spiked with known amounts of amine standard.” Is that a sample with internal standard? Doesn’t this mean that individual amines in ambient aerosols are mixed with corresponding amine standards? Please clarify this.

(2) Fig. 2: To investigate the effect of pH, did the authors use the amine standards? How did they control or change pH? Is the dependence on pH applicable to any cases with various concentration ranges of each amine? The authors should clarify these points.

(3) P.2139, L.6-11: Based on the analytical result from one sample (Table 3), the authors state that the concentrations of amines measured by the GC/MS are higher than those measured by the IC. They attributed this difference to evaporation losses of amines during the sample concentration and SPE separation procedures. However, this result is true for just one sample, and is this applicable to the other 23 samples which the authors obtained in this study? The authors should show how representative the analytical result is.

(4) Table 3: The authors should add LOD in ng m−3 under the sampling condition of the ambient aerosol.

(5) Fig. 6: The authors state that they used the cation-exchange cartridges to remove

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the interfering cations. Even if 85% of TMA was lost by evaporation, the remaining 15% TMA peak should appear in the IC chromatogram (Fig. 6b). Where can we see the TMA peak in the chromatogram after the SPE pre-separation? Or if it is absent, then how did the authors estimate that “85%” of TMA was lost?

(6) Fig. 6(b): How did the authors assign peaks after the pre-separation? Did they use amine standards to assign each of them? I would like to point out that on the lower left side of the peak 9 in Fig. 6(b), there seems to be another peak overlapped with peak 9. All of these points should be clarified.

(7) Introduction: I suggest the authors to add the following references regarding aliphatic amines in the Introduction section.

(On atmospheric reactions of aliphatic amines)

Angelino et al., Environ. Sci. Technol., 35, 3130-3138, 2001.

Murphy et al., Atmos. Chem. Phys., 7, 2313–2337, 2007.

(On marine sources of DEA and ON)

Miyazaki et al., Atmos. Chem. Phys., 11, 3037–3049, 2011.

Interactive comment on Atmos. Meas. Tech. Discuss., 7, 2127, 2014.