

Interactive comment on “A Vacuum Ultraviolet Ion Source (VUV-IS) for Iodide-Chemical Ionization Mass Spectrometry: A Substitute for Radioactive Ion Sources” by Yi Ji et al.

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Received and published: 22 April 2020

Referee comment: "... the authors describe how to apply a commercially available krypton lamp that emits two Kr lines in the VUV at 123.582 nm (10.030 eV) and 116.486 nm (10.641 eV)." "Line 17: the light, which is emitted are atomic lines as mentioned above and not wavelength bands as written by the authors. The right values for these lines are given above."

Author response: We have modified the texts as suggested. However, we note that the emission lines from krypton lamps exhibit significant pressure broadening.

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Referee comment: "The description of figure 3 and figure 5 is sometimes a little confusing. This should be improved. Maybe the authors could indicate figure 3 a,b,c,d and 5 a,b,c,d instead of saying "upper left" and "lower left". "

Author response: We modified Figure 3 and 5 (Figure 4 and 3 in revised manuscript, respectively) "upper left" etc. to i, ii, iii, iv, to avoid confusion with VUV-IS configuration (a) and (b).

Referee comment: "At line 176 the authors write: "At 40 Torr, up to 58.9 ppmv C₆H₆ was added to 1.8 ppmv of CH₃I to reach the maximum level of sensitivities (157, 166, and 138 Hz pptv⁻¹ for formic acid, Cl₂ and ClNO₂, respectively) when using 19.0 ppmv of CH₃I." I suspect the 58.9 ppmv should be exchanged by 19 ppmv as shown in the lower left part of figure 5. Also in Table 1 this should be corrected: Instead of 0-58.9 it should be written 0-19, I guess. It would also be easier for the reader to follow, when in figure 3 upper left would be written in the graph: 9.6 ppmv CH₃I, in the lower left 1.6 ppmv CH₃I, in figure 5 upper left: 8.8 ppmv CH₃I and lower left : 1.8 ppmv CH₃I. In the figure caption the same values like in the text should be used: 110 ppmv and 8.8ppmv."

Author response: The text in line 176 (line 180 in revised manuscript) and Table 1 were both correct (58.9 ppmv of benzene was used here). The lower left panel (iv) of Figure 5 (Figure 3 in revised manuscript) was modified to the correct plot. The amount of CH₃I used was provided on the figures and captions as suggested.

Referee comment: "It would also be good for the reader to indicate some masses of the spectra like it is explained in the text."

Author response: We have modified Figure 5 and 8 as suggested.

Referee comment: "The authors used two configurations to show that configuration a generates many additional ions compared to a radioactive source. The explanation is that these ions might be created by the VUV radiation. Do the authors see all these

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additional ions also when they do not use any methyl iodine or benzene?”

Author response: Yes we did tests without CH₃I or benzene, and additional peaks (e.g. Cl⁻, O₂⁻ and masses associated with O₂⁻ chemistry) similar to those in Figure 5(2) were observed when using VUV-IS configuration (a). These additional peaks didn't show up when using VUV-IS configuration (b). These tests also indicate the source of the interference peaks are photoelectrons generated on the illuminated surface of the flow tube.

Interactive comment on Atmos. Meas. Tech. Discuss., doi:10.5194/amt-2020-13, 2020.