

Interactive comment on “Enhanced secondary organic aerosol formation from the photo-oxidation of mixed anthropogenic volatile organic compounds” by Junling Li et al.

Anonymous Referee #1

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General Comments:

This manuscript presents the SOA production from individual anthropogenic VOC precursors (i.e., n-dodecane and 1,3,5-trimethylbenzene) versus the system of mixed VOCs. Enhanced SOA yields were observed with mixed VOC precursors compared to the linear addition of SOA yields derived from individual VOC precursors, indicating the significance of chemical interactions between intermediate products from these two precursors. Overall, this study provides useful information and highlights the complexity of SOA chemistry in the mixture of VOCs representative of real atmosphere. One major comment is that although ESI-TOF-MS data were presented (in Table 2), the

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molecular composition of SOA unique for each system was not discussed in detail to probe the underlying chemical processes. More in-depth discussion is required. The difference between measured m/z and theoretical m/z of proposed molecular formula should also be reported for appropriate QA/QC of accurate mass fittings.

Specific Comments:

- (1) Line 166: $5.0 \times 10^7 \text{ nm}^2/\text{cm}^3$ (please correct the superscripts here)
- (2) Line 219: What are the repeating units (i.e., monomers) of oligomers detected in the range of m/z 500-700? Are they related to the reactive intermediates of individual VOC precursors? More information is needed to directly support the chemical interactions between two precursors.
- (3) Line 244-247 and 301-303: To determine the potential functional groups in SOA extracts, it would be best to acquire complementary IR spectra. It seems premature to reach these conclusions based on the UV-Vis spectra shown in Figure 5.
- (4) For Figure 5, the absorbance is proportional to the concentration of SOA extracts. What are the mass concentrations of SOA solutions for samples presented in Figure 5? It would be better to present the mass absorption coefficients (MACs) to understand their light absorption properties.
- (5) Line 299: interaction “occurs”

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