

The manuscript by Flueckiger and Petrucci developed a new method of adding VOCs for smog chamber study. This method is expected to improve the reproducibility of the chamber experiments. However, the whole work just like the experiment results without deeply scientific. Some parts of this manuscript still need to be supplemented, and it does not meet the requirements of this journal at the current version. The specific comments are listed as follows.

1. Page 1, Section Introduction. The scientific aspects of the need to study SOA formation at low VOCs concentrations should be mentioned in the Section Introduction, such as the fact that VOCs concentrations will affect the distribution of oxidation products and the oxidation state of SOA, as reported by previous studies conducted by Chen et al. (2019, 2022) and Alfarra et al. (2012).
2. Page 2, Section 2.2. My biggest concern is that in order to verify the reliability of the improved method, a sufficient number of parameters of particle properties, including the physical and chemical properties, should be measured. In particular, the chemical properties should be carefully addressed, such as the formation of oxidation products and the oxidation state of SOA.
3. Another of my concerns is whether this new method of adding VOCs affect the formation of gas phase products and the vapor wall loss, which is thought to be crucial to SOA formation, as reported by Zhang et al. (2014).
4. Page 3, Section 2.4. Please check the Eq. (4).  $\xi_{\text{VOC}}$  should be  $V_1$ ?
5. Page 4, Section 3.1. Why this compound of cis-3-hexen-1-ol (HXL) was chosen instead of the previously mentioned  $\alpha$ -pinene?
6. Page 5, Section 3.2. The calculation of RSD is based on the results obtained at the end of the reaction, right? However, this ignored the complex changes in time evolution during the reaction. Thus, more consideration of overall behavior of SOA formation is needed.

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