

In the manuscript titled "Preparation and purification of atmospherically relevant α -hydroxynitrate esters of monoterpenes", McKnight et al described the synthesis of a series of nitrate esters. Currently there is large uncertainties in secondary organic aerosol formation especially from organic nitrate esters derived from biogenic volatile organic compounds, in part hindered by the availability of standards. Thus, availability of nitrate ester standard would bridge the critical knowledge gap exists in our further understanding of the mechanism of aerosol formation. This would be of interest to the reader of ACP.

There are a few points the reviewer would like the author to address.

1. First of all, since this is a journal on atmospheric science and the title stated "Preparation and purification of atmospherically relevant α -hydroxynitrate esters of monoterpenes", the reviewer feels that it is worthwhile to more specifically spell out the relevance of the synthetic targets with atmospheric chemistry mechanistically. The way the authors frame the whole set of compounds as a general class "nitrate ester of monoterpenes" is good in a general way with the synthesis of variously nitrate esters as the general aim, a little bit more detailed account on the relevance of all the targeted compounds with atmospheric chemistry would be appropriate for majority of the reader of this journal. The author did an extensive investigation on the reaction of nitrate with epoxide, if that were to be emphasized for its relevance, it would be better to spell out clearly.
2. As the author presented in the manuscript, IR would provide characteristic peaks for NO₂ group, supporting the existence of nitro group in the analyzed molecule. As the indicated in table 1 of this manuscript, compared to the corresponding alcohols, the nitrate esters likely would have very similar NMR spectral profile with only the proton and carbon at the alpha position to the nitrate ester group to likely exhibit significant chemical shift difference. On the other hand, mass spectroscopy would be very important in such characterization if a good spectrum is feasible. The absence of such data from many nitrate ester target compounds in this manuscript would be better to be explained since only the HRMS of a few of them are provided.
3. The opening of the cis and trans-1,2-limonene oxide with Bi(NO₂)₃ under the same conditions led to different nitrate ester with nitro group attached to different positions to afford different constitutional isomer, instead of stereoisomer. The reason behind it might be the same as the kinetic resolution of the cis and trans-1,2-limonene oxide. This fact merits more discussion and more detailed 2-D NMR spectroscopy evidence in addition to those original 1-D NMR spectrum provided by the author would be very helpful to go with the description text.
4. The characterization of limonene-diol doesn't seem to match with other report (J. Am. Chem. Soc. 2018, 140, 1502–1507). Since the other report provided the original NMR spectrum, it would be feasible for the author to provide an explanation of the discrepancy. Furthermore, in figure 4, the author attributed the transformation of compound 10 to 11 and back an interchange equilibrium. That interpretation is better to be explained further since it is not obvious.
5. There are other suggestions
 - a. Page 1 Line 21. The abbreviation "ON" is not necessary as it is used only once.
 - b. Page 2 Figure 1. Compound 1 is basically compound 13 without stereo isomer indication.
 - c. Page 3 Line 17. "0.86 mL, 1 g" incorrect.
 - d. Page 3 Line 25. Citation year incorrect.
 - e. Page 3 Line 27. Citation better to be placed at the first mention.
 - f. Page 4 line 10. "(9 am – 11 am)" relevant?
 - g. Page 5 line 7. Citation better to be placed at the first mention