

Atmos. Chem. Phys. Discuss., referee comment RC2  
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## Comment on acp-2022-535

Anonymous Referee #2

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Referee comment on "Chemically distinct particle-phase emissions from highly controlled pyrolysis of three wood types" by Anita M. Avery et al., Atmos. Chem. Phys. Discuss., <https://doi.org/10.5194/acp-2022-535-RC2>, 2023

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The paper titled "Chemically distinct particle-phase emissions from highly controlled pyrolysis of three wood types", by Avery and Co-Authors presents the results of 18 experiments in which the authors investigate the chemical composition of aerosols generated during the pyrolysis of wood typical of the western US. The authors investigate 3 variables: wood type, wood size, and temperature. The results are corroborated by the comparison with the chemical composition of aerosolized cellulose carried out in the lab. One of the major strengths of the results presented here is that the experimental setup guarantees that the aerosols are generated by pyrolysis only, with no combustion happening, thanks to the use of a heated nitrogen flow. The study is of interest to the scientific community and addresses relevant scientific questions, such as the chemical composition of aerosol generated during pyrolysis. This topic is well within the scope of ACP.

The main weaknesses of the paper are the lack of a schematic picture of the pyrolysis reactor, the relatively small number of repeated experiments, the lack of explanation of the uncertainties, and the lack of measured dilution for the maple samples.

The data presented are novel and the conclusions reached are substantial and will be of use for the interpretation of future data (e.g., the oxidation state of emitted OA that remains largely constant over the course of a pyrolysis experiment, and that CO<sub>2</sub>+ greater than five is identified as a marker for pyrolysis). The methods are valid, in particular, the repeatability of the temporal profiles is remarkable.

Title: I recommend either adding a hyphen to "particle-phase" or just using "particles"

40 biofuel burning, I recommend adding a reference

84 "Previous work has shown ...", citation needed

135 please add which different conditions are explored

160 Section 2.1, I recommend adding a schematic picture of the reactor it would help the reader follow the text without having to dig up the previous paper cited.

166 please add that the wood was cut along the grain lengthwise as it's important later on in the paper

173 m<sup>3</sup>/s correct the format for the units

175 "The aerosol sampling line was further diluted" Please add the range of dilutions used

187 "The size distribution of particles was well within the AMS standard lens size range" I recommend corroborating this statement with a picture in the SI

278 "The uncertainty for the ER ..." add here or in the method section a line/citation on how they are calculated

288 "The uncertainty for the EI ..." add here or in the method section a line/citation on how they are calculated