

## General comments

The present study by Bruns *et al.* addresses the inter-comparison between laboratory smog chambers and flow reactors systems. The OH radical reaction of  $\alpha$ -pinene as well as wood combustion emissions were used as model systems for the present study. The comparison was focused on the organic aerosol yield and the chemical composition. In general, the paper is very well written and the presented data set will be of huge relevance for the aerosol community.

## Specific comments

A comparison of smog chamber (SC) and flow reactor systems (PAM and MSC) is so far missing in the literature. Nevertheless, it is not clear why different types of OH radical sources were selected for the comparison present in this study. Furthermore, it is a bit confusing which OH source was used for which experiment. This information should be clearly written in the experimental section and it should be included in Table 1. Furthermore, Table 1 should also contain information about  $\text{NO}_x$  and ozone concentrations as well as if the experiment was seeded or unseeded and which UV lamps (wavelength) were used for each experiment.

Even that the influence of  $\text{NO}_x$  is discussed at page 319 a discussion about side reactions is missing. Depending on the ozone concentration during the ozone photolysis, ozonolysis might take place changing the product distribution. It would be helpful for the discussion to provide a picture with the ozone concentration over the whole experiment duration. Besides this reaction, it can be also expected that the different types of UV lamps used for the experiments change the product distribution and aerosol yield due to photolysis of OVOCs (Presto *et al.*, 2005).

Page 316, Line 12: The dilution might lead to a loss of VOCs/OVOCs. Is this considered?

Page 318, Line 21: How was  $\alpha$ -pinene oxidized in the PAM? According to Table 1 it was also oxidized in the PAM but in section 2.3 no information about these experiments is given.

Page 319, Line 16: Even that the  $\text{NO}_x$  concentration was zero at the beginning of the experiments a huge increase of  $\text{NO}_x$  concentration during three hours of experiment can be expected. It would be helpful for the discussion to provide a picture with the  $\text{NO}_x$  concentration over the whole experiment duration.

Page 323, Line 15: Is it not clear why few of the experiments were conducted in the presence of seed particles and some not. It is known that the presence and type of seed particles can influence the partitioning of oxidation products (Spittler et al., 2006). In the absence of seed particles nucleation will occur forming a pure organic particle. This will change the partitioning behavior of the OVOCs and thus the aerosol yield. This might also explain the much lower aerosol yield obtained from the PAM.

## Technical corrections

Page 310, Line 25: The sentence (“*For the wood combustion...*”) should be rewritten.

Page 325, Line 26: “*gas-phase*” should be changed to gas phase.

Page 344, Table 1: Please include a description for PAM/MSC<sub>low, mid, high</sub>. This is not given in the description of the Table or in the manuscript. Is it also not clear which numbers are given in parentheses.

Page 352, Figure 8: The figure caption should be rewritten. A short description for  $\theta$  in the figure caption would improve the understanding of the figure.

## References

Presto, A. A., Hartz, K. E. H., and Donahue, N. M.: Secondary organic aerosol production from terpene ozonolysis. 1. Effect of UV radiation, *Environmental Science & Technology*, 39, 7036-7045, 2005.

Spittler, M., Barnes, I., Bejan, I., Brockmann, K. J., Benter, T., and Wirtz, K.: Reactions of NO<sub>3</sub> radicals with limonene and alpha-pinene: Product and SOA formation, *Atmospheric Environment*, 40, S116-S127, 2006.