Atmos. Chem. Phys. Discuss., 12, C2579–C2580, 2012
www.atmos-chem-phys-discuss.net/12/C2579/2012/

Atmospheric Chemistry and Physics Discussions

Interactive comment on "Photo-oxidation of pinonaldehyde at low NO_x: from chemistry to organic aerosol formation" *by* H. J. Chacon-Madrid et al.

Anonymous Referee #1

Received and published: 15 May 2012

The study presents SOA yields of a sequence of molecules reacting with the OH radical at low NOx. Each molecule of the sequence (n-pentadecane, n-tridecanal, pinonaldehyde) has a similar vapor pressure but functionalities are different. This is a follow up study of an earlier paper presenting the same set of compounds reacting at high NOx. Similar to that study they find again a lower yield of the aldehyde compounds compared to the alkane. This can be understood from the high reactivity of the aldehydic H-atom which is attacked first by OH atoms and finally leads to a fragmentation of the molecule. Contrary to this alkanes are functionalized and therefore compounds of lower volatility are produced. Thereafter, the authors discuss the observed difference of SOA yield from pinonaldehyde photo-oxidation and attribute the lower yield at low NOx to UV

photolysis of peroxides. The approach taken by the authors in order to investigate the influence of chemical structures and mechanisms on SOA yield and ageing is interesting. However, the experimental realization is inadequate. Each experiment has been performed only once! To my understanding this is not good laboratory practice. Smog chamber experiments are quite complex and variation from experiment to experiment can be substantial. The constant SOA yield in case of the dark experiment is quite unusual and makes me skeptical whether something went wrong with the experiment or if there are issues with the data analysis (e.g. changing collection efficiency in the AMS with increasing OM, could an impurity in pinonaldehyde produce SOA by ozonolysis in the dark experiment?). In Figure 4 SOA yields become similar at higher mass concentrations questioning the UV light effect. I do not consider the presented results to be convincing and recommend that the authors perform a decent set of experiments.

Interactive comment on Atmos. Chem. Phys. Discuss., 12, 7727, 2012.