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Interactive comment on “Ozonolysis of surface adsorbed methoxyphenols: kinetics of aromatic ring cleavage vs. alkene side-chain oxidation” by E. M. O’Neill et al.

Anonymous Referee #2

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The paper “Ozonolysis of surface adsorbed methoxyphenols: kinetics of aromatic ring cleavage vs. alkene side-chain oxidation” by O’Neill et al. demonstrates a very detailed study on the heterogeneous kinetics of surface adsorbed different lignin pyrolysis products at the reaction with ozone at simulated sunlight and varying relative humidity. Diffuse-reflectance and ATR- FTIR spectroscopy used to characterize the educts and reaction products. Further, GC-MS, ¹H-NMR and UV/VIS spectroscopy as well as theoretical calculations were also used. Apart from pure kinetic parameters, atmospheric lifetimes could be calculated. The paper is well written and absolute within the scope of Atmospheric Chemistry and Physics. I recommend publication of this paper after

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considering some minor tasks.

Some parts of the methods section could be more detailed:

Please describe in detail the 10m transmission cell, especially the volume, material, duration of dwell of the gases, . . . Is a single path-cell or some kind of multi-reflection optics?

The authors should also mention the method of determining the relative humidity as well as the dew point of what they call 0% RH. The residual content of water of dry air is important related to heterogeneous reactions involving monolayers. The authors should discuss the influence of the remaining water molecules on the molecules adsorbed on the inorganic surfaces.

If the xenon lamp mentioned on page 19976, line 18, which was used as solar simulator, is the same as in the supplement section, the authors should refer to the figure in the supplement. Further the method of determining the spectral irradiance of the xenon lamps should be mentioned.

Section 3.1 and following:

While dealing with monolayers, it is applicable to refer to parts of a monolayer like 0.9 monolayers than reporting the 'exact' number of molecules per square metre.

The detailed discussion of the entire heterogeneous mechanism is hampered by the impossibility to clearly distinguish between ER or LH type mechanisms. This discussion is done twice (section 3.2 and 3.3). I suggest shifting both discussions to a separated section, dealing only once with this topic and problem.

The authors should check the paper for missing units like table 1: missing unit [cm^{-1}]; although it is obvious. Further, the authors could think about presenting difference spectra I1/I2 to indicate spectral changes or differences instead of laying infrared spectra on top of each other.

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