

Interactive comment on “Heterogeneous ozonation kinetics of 4-phenoxyphenol in presence of photosensitizer” by S. Net et al.

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We greatly appreciate the constructive comments of the anonymous reviewer. We have tried to take care of each comment appropriately. The following list contains our response to the reviewer's comments and a list of all corrections and changes which have been performed.

General and specific remarks

a) The following text was added in the manuscript: To check the possibility of 4-CB as a mediator in the reactions between ozone and 4-PP we performed the reaction between ozone and 4-PP in absence and in presence of 4-CB without light irradiation. No changes were observed in the degradation of 4-PP in both cases. The obtained re-

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sults are presented in the supplementary electronic material (Figure 10S). In addition, it is noteworthy that the electron transfer mechanism between the excited triplet states of many organic compounds and molecular oxygen induces formation of electronically excited singlet state of molecular oxygen, $O_2(1\Sigma_g)$ (Styler et al., 2009). Presumably, $O_2(1\Sigma_g)$ may react with 4-PP and increase its rate of degradation under light irradiation in absence of ozone. Such possibility was already examined by Anastasio et al., 1997 who showed that organics such as 4-CB may act as photosensitizers and that phenols and substituted phenols such as 4-PP serve as the donor of electrons for reduction of O_2 to hydrogen peroxide. Based on these findings the mechanistic proposition is given below for the reaction between ozone and 4-PP in presence of 4-CB as a photosensitizer. b) The symbols in Figure 1 which represent the various ozone mixing ratios are now included in the legend of Figure 1. c) The following text was added in the manuscript: Assuming a uniform particle surface coverage, the amount of 4-PP adsorbed on silica particles were below a monolayer. 2g of silicon oxide corresponds to a total specific surface of 520 m² (260 ± 30 m² g⁻¹ from supplier). Assuming a spherical geometry, 40 mg of 4-PP and of 4-CB possess a surface of 225 m² and 268 m², respectively. The percentage of aerosol surface coated with 4-PP was $\sim 43\%$ and with 4-CB was $\sim 50\%$ of monolayer and the average 4-PP or 4-CB loading on the silica particle was $\sim 2\%$ by weight. d) We extensively modified this discussion and it is now presented in five different sections (for the details of this discussion see the revised manuscript).

3.3 Single-component heterogeneous reactions 3.4 Modified Langmuir-Hinshelwood mechanism 3.5 Treatment of the kinetic data with the modified Langmuir-Hinshelwood mechanism 3.6 Langmuir-Hinshelwood mechanism for bimolecular surface reactions 3.7 Langmuir-Rideal mechanism for bimolecular surface reactions Minor issues: All the minor issues were taken into consideration

Please also note the supplement to this comment:

<http://www.atmos-chem-phys-discuss.net/9/C8613/2009/acpd-9-C8613-2009->

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