

GENERAL COMMENTS

Based on the extensive data from the field collected during the summertime campaign in Beijing, the manuscript discusses formation mechanisms of the most abundant groups of atmospheric nitroaromatic compounds, nitrophenols and nitrocatechols. The represented dataset is very valuable and the manuscript is well structured, however the conclusions made by the authors are sometimes vague and require more justification.

The authors distinguish between biomass-burning and anthropogenic emissions. As BB emissions are often of an anthropogenic origin, please make it clear that you mean traffic emissions when referring to anthropogenic emissions.

In the introduction, much space is devoted to biomass burning as a possible source of NP and NC, however the characteristic methoxyphenols (substituted guaiacols and syringols) and their nitrated analogues are not even mentioned. Why don't you report the concentrations of (nitro)guaiacols and (nitro)syringols (maybe you didn't detect them?). This could help support the statement that anthropogenic (traffic?) emissions prevailed over biomass burning emissions during the campaign. To my opinion, this assumption is not justified enough in the manuscript (although it is very likely to be true). Also, explain why primary emissions are not likely the important source of measured NAC.

In the cited paper of Frka et al. it is nicely demonstrated that the usage of surrogate molecules for the quantification of aromatic isomers by LC-MS can result in the over- or underestimation of the concentration of analyte, even for the factor of 10. The case of 3M4NC and 3M6NC is specifically exposed, as well as their misidentification in the past studies. Make it clear that you considered this issues during the analysis (if not, 3M6NC is more likely to be 3M4NC) and comment on the determined concentration of 3M6NC by use of 4M5NC standard. Reconsider also the conclusion in L224-226. Moreover, how do you know that DMNP peaks are truly dimethylnitrophenols and not ethylnitrophenols or their methoxylated isomers?

The language should be edited before the manuscript is published in ACP.

SPECIFIC COMMENTS

L60-62: how can MNC form by the oxidation of catechol? Did you mean methylcatechol?

L64-65: the sentence is misleading. In Fig. 1 you only show the most generally accepted pathways of gas-phase NAC formation. Revise the sentence for clarity and/or show also the aqueous-phase chemistry which you are referring to later in this paragraph. I strongly suggest extending the figure to at least the aqueous-phase formation of NC, which you show to be dominant in the atmosphere. Include also the relevant references in the figure caption.

L71-72: refer here to the very recent and comprehensive study on the possible nitration mechanisms of activated methoxyphenols in the atmospheric aqueous phase by Kroflič et al.:
<https://pubs.acs.org/doi/10.1021/acs.est.8b01903>

L72: 'Nitrophenols could form through the nitration and hydroxylation of benzene...' note that NO₂ group deactivates the aromate, whereas OH makes it more reactive. Therefore, oxidation-first and nitration-second is more likely to occur. Change the order accordingly.

L93-94: I cannot see it obvious that anthropogenic emissions dominated during the campaign.

L149-150: check again, NP is also not always higher than in other studies.

L192 (and Fig. 3 caption): what kind of pollution episodes?

L210, L290, L326-327: It seems like photolysis is not important for the aqueous-phase products (NC)?

L219-222: refer also to Fig. 9 – at the nighttime RH levels, daytime ratios are also not dependent on RH anymore.

L259-260: 'NO₃-concentrations and (NO₃-)/NACs ratios showed significant increasing trends (Figure 5a, b, c).' Not sure if I can see this, especially for the ratio. Please correct.

L325: Use here the original research of Frka et al. to avoid misunderstanding:
<https://pubs.acs.org/doi/abs/10.1021/acs.est.5b01811>

Fig. 7: cannot find r value referred to in the caption.

Fig. S5: this is again only gas-phase chemistry presented. Make this crystal clear or add also heterogeneous/aqueous-phase pathways.

TECHNICAL CORRECTIONS

The usage of word 'obvious' is excessive. You should avoid it throughout the text.

It is not clear to me why you used Results and Discussion section 3 and later on again a Discussion section 4. I would use only section 3 – Results and Discussion.

L16 and L47: the phrase 'ultraviolet light absorption by brown carbon' is incorrect, the characteristics of BrC is visible light absorption. Please correct accordingly.

L162-165: the sentence needs revision.

In general, the language, especially the grammar, requires editing.