

## ***Interactive comment on “Size-resolved exposure risk of persistent free radicals (PFRs) in atmospheric aerosols and their potential sources” by Qingcai Chen et al.***

### **Anonymous Referee #2**

Received and published: 28 July 2020

This paper reports measurements of environmentally persistent free radicals (EPFRs) in particulate matter sampled in Linfen, China. The measurements took place in 2 seasons and involved size-resolved samples. The work makes a contribution to our understanding of this unique group of health actors, so should be published pending the authors addressing some general and specific comments.

General Comments: There are sections of the Result and Discussion that are repetitive and could be better organized and made more concise. I will point those out in the specific comments, and I strongly recommend the authors go through the paper with an eye towards making it more clear. The authors use the term “formation mechanism”

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throughout the paper, but they present nothing that resembles the chemistry that would constitute a formation mechanism. I think the authors need to find a better term that describes what they mean, or show actual chemical mechanisms.

Specific Comments: Line 17: I am always skeptical when people claim ‘firsts’. In addition this is phrased in the past tense. Why not just say “This study reports...”? Lines 101-102: How long were the samples refrigerated before analysis? Lines 141-142: The phrase “find a solution to the final solution” sounds awkward and should be rephrased. Lines 190-192: The phrasing here is unclear. I think the authors mean the size-segregated contribution of EPFR concentration to the overall. Is this contribution by mass, it’s not clear? Line 195: What kind of EPFRs are found in dust particles? Metals? Lines 207-233: This paragraph was hard to follow, I think because the authors skipped around from sentence to sentence in their discussion of g-factor, concentration, size fraction and season. Sometimes a sentence would be referring to the previous sentence, but in a way that was hard to follow. I would like to see this section rearranged so that it has a more logical and clear flow. Pick one feature at a time and make sure it is clear in each sentence what is being referred to. Lines 244: Could it be that the POC in these samples is actually from secondary organic aerosol formation? Lines 254-256: Here the authors are talking about a graphite oxide formation mechanism – this would be greatly improved if they could show the actual chemical reactions – that is what constitutes a mechanism. Lines 243-314: These paragraphs have the problems as the discussion of g-factors. Everything is mixed together, with sentences that are hard to follow. I suggest really trying to reorganize this so that it is easier to follow. Line 339: I believe this should be Gehling and Dellinger, (2013). Lines 402-403: This sentence is backwards, the trachea and alveoli are exposed to EPFRs not the other way around.

Figures: It is hard to distinguish the blue and green colors in the (a) panels of Figures 1 and 2. Please choose better colors.

Supplement In the first paragraph there is superscript 3 – is this supposed to be a

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reference? Figure S7 - the caption and axis – ‘modle’ should be ‘model’.

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