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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Effect of atmospheric ageing on volatility and ROS of biodiesel exhaust nano-particles" *by* A. M. Pourkhesalian et al.

Anonymous Referee #1

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Effect of atmospheric ageing on volatility and ROS of biodiesel exhaust nano-particles A. M. Pourkhesalian1, S. Stevanovic1, M. M. Rahman1, E. M. Faghihi1, S. E. Bottle1, A. R. Masri2, R. J. Brown1, and Z. D. Ristovski1

GENERAL COMMENTS 1. The data contained within the ms has some merit in being published related to the fuel composition affecting reactivity with ozone and UV light and subsequent product formation. That said, there are (what this reviewer considers as) major changes to be made before the manuscript becomes more comprehensible. At present, it is difficult to discern whether the data support the authors' conclusions.

See further comments below. 2. Very sweeping statements are made by the authors that need to be "toned down" by indicating more specifics. For instance in starting off the Volatility measurements (section 3.1) the authors state: a. "It is clearly seen in the figure [Figure 2] that the volatility of the particles increased after exposure to oxidative agents." This is not clear to this reviewer; I see a possible increase with the C810 fuel (pending clarification of the values and bars [spec comment #1] and then statistical analyses) but certainly not C1875, C1618, and maybe not C1214. The authors back off of the generalization further on in the ms text; this overstatement of a general trend needs to be eliminated. b. Similarly the same type of overgeneralized statement are made again later in the ms: (p.6492) "In Figure 5 it is clearly visible…" and A clear trend between the fuel oxygen content and ROS concentration is evident from Figure 6." Any inferences from these data need to be stated more carefully by being more specific. 3. In discussing the implications of their conclusions, the authors should also point out that these studies were done only with one load/one engine speed and one engine type, and therefore the findings may or may not be applicable to other engines, loads and/or speeds until tested.

SPECIFIC COMMENTS 1. It is unclear how the data are expressed. Means or medians; are the bars (where they exist) SD or SEM; any statistical analyses done, etc. For correlations, what are the R2 values? Until these parameters are clearly stated it is difficult to ascertain if differences in points are truly statistically different. 2. Please increase the symbol size in the figures- they are difficult to discern. 3. Is there a biodiesel fuel that has the majority of fatty acid Carbon length as C18 and C75? 4. How variable were the ozone concentrations and UV flux values? 5. Editing: ageing or aging- this is spelled two different ways in the ms; some abbreviations are introduced appropriately ie, spelled out the first time) but others are not, eg DPM on p 6482; some words do not need capitalization (though the abbreviation may be capitalized), eg, p6485 should be reactive oxygen species (ROS), ditto for fatty acid methyl ester. 6. Awkward statement p. 6483: "there are numerous studies reporting using biodiesel decreases the diesel primary emissions." Suggest a rewording.

Interactive comment on Atmos. Chem. Phys. Discuss., 15, 6481, 2015.