

## ***Interactive comment on “Optical Properties and Aging of Light Absorbing Secondary Organic Aerosol” by Jiumeng Liu et al.***

**Anonymous Referee #2**

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BrC has raised attention over the past decade because of its important contribution to light absorption and climate forcing. The authors aimed to unravel the complex links between SOA light absorption and chemical composition. To achieve this goal, biogenic VOCs (isoprene, alpha-pinene) and anthropogenic VOCs (TMB, toluene) were exposed to varying NO<sub>x</sub> levels in a chamber. The results show BrC formed from anthropogenic VOCs; specifically, the toluene SOA has the highest absorption under high-NO<sub>x</sub> level and 30-80% RH conditions. They found a nearly 50% underestimate of the MAC values based on a partitioning model, which is usually the case for current climate models. They also discussed the effect of RH and aging on the optical properties of aromatic BrC. In the end, the authors calculated the imaginary refractive indices and compared them with previous literature values. Overall, the experiments are described well and the results provide new insights into the BrC light absorption. I

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favor its publication in ACP with the following minor revisions.

-in section 3.3, why is there no absorption enhancement when RH was increased from 30% to 80%?

-fig 1, the alpha-pinene SOA has a higher absorption than the isoprene SOA over the 300-350 nm wavelength range. It might be appropriate to comment on this. It will also be useful to list the MAC values in the supplement.

-fig 6, it's interesting that the authors observed a decline in the MAC values within 10 hours. I wonder whether the authors tried the 80% condition. And I suggest listing the change in MAC values over time in the supplement.

-please add a column in table 1 to label the high-NO<sub>x</sub>, low-NO<sub>x</sub> and NO<sub>x</sub>-free levels.

-line 178, delete (Lin et al., 2014b). Citation already given in line 176, be careful about repeating the citation, line 194, 220, 240, 242. . . . .

-line 242 and line 412, there is some ambiguity. Is biomass burning anthropogenic or non-anthropogenic? In line 242 the authors see it as anthropogenic, in line 412, however, it is treated as non-anthropogenic.

-line 273 to line 275: I would suggest rephrasing the sentence.

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