The authors thank the Anonymous Referee #2 for the positive review and the comments, which will help us to improve the manuscript.

Efflorescence point of untreated AA - You report that untreated AA typically effloresced at RH 59.9%. Does this value fall within the known range of values in the literature, or at least beneath any reported deliquescence points? And if so, can reference(s) be provided?

To the best of our knowledge, the deliquescence or efflorescence of *trans*-aconitic acid is not reported in the literature. However, for *cis*-aconitic acid, one study reported that no crystallization was observed (Han et al., 2022). However, also in our experiments, some of the unreacted particles did not exhibit any efflorescence as well upon drying.

This information will be added to the beginning of section 3.4 in the revised manuscript.

Assumption regarding κ retrieval after aging - The statement that fitting at higher RH provides a better estimate of κ, as deviations from ideality become less important with dilution, is reasonable. However, this implicitly assumes that no further chemical processing occurs once UV and O_3 *are switched off. It would be useful to state this assumption explicitly. It would also be good to discuss whether the possibility of slow processing post UV and/or ozonolysis is (un)likely.*

The assumption that no further chemical processing occurs once UV and O_3 are switched off will be added in a revised version of the manuscript.

In the example shown in Fig. 4, we do not observe significant mass loss after switching off UV and O_3, once the RH and temperature are stabilized. Thus, it is unlikely that the reaction continues upon drying. In addition, since the viscosity of the particles is higher after chemical processing, it would be more difficult for the particles to undergo any reaction upon decreasing the RH. However, as shown in Fig. 6, slight mass loss is observed upon increasing the RH from 6.3% to 28.2% and keeping the particle at elevated RH for several hours. The observed mass loss could be due to volatilization of some of the remaining products or slow chemical processing. This mass loss is more significant after the second RH step (28.2% to 49.4%), which might indicate further chemical processing at higher RH. The discussion will be added in a revised version of the manuscript.

Kinetic limitations - related to the previous point, the κ interpretation also appears to assume no kinetic limitations to hygroscopic mass transfer. It may be worth briefly commenting on whether slow diffusion / kinetic constraints could influence κ retrieval, particularly given the wider viscosity discussion.

For κ retrieval, we use the RH range 62%-80%. At elevated RH, we do not expect any kinetic constraints that could influence κ retrieval. This can be seen also in Fig. 4. While the first RH step (6.3% to 28.2%) shows kinetic limitations, the second RH step (28.2% to 49.4%) does not show any limitations. This indicates that even particles that become viscous at low RH, at RH above 50%, the water diffusivity is greater than 2×10^{-9} $cm^2 s^{-1}$, see discussion in Appendix D. This ensures that the particles in our set-up are close to thermodynamic equilibrium in the range where we measure κ.

Link to brown carbon potential - the results could be relevant to the developing brown carbon narrative. You already hint at the formation of potentially more photoreactive intermediates when describing the non-linear photolysis kinetics ("slow in the beginning, then speeds up..."). Some speculation on the possible implications for BrC formation or optical properties could strengthen the wider atmospheric relevance of the work.

We thank the reviewer for pointing out this possible implication. We will extend the third paragraph of section 3.2 accordingly:

"In contrast to ozonolysis, the shape of the photolysis decay kinetics is not linear. It is slow in the beginning, then speeds up possibly due to the formation of more photoreactive intermediates or due to the initiation of an autocatalytic process. After about 60% mass loss, the reaction slows down again, most likely because most photoreactive species are consumed and non-absorbing products are formed (photobleaching) or because of radical recombination. We conclude that similar to the findings by (O'brien and Kroll, 2019) and (Sun and Smith, 2024), initial photolytic mass loss cannot be extrapolated to the entire SOA mass loss and that a photo-recalcitrant fraction remains, which prevents or slows down further mass loss. In the study by Sun and Smith (2024), Suwanee River Fulvic Acid (SRFA) was used as a surrogate for brown carbon SOA. They observed that UV photolysis of an aqueous SRFA solution results in photobleaching at UV wavelengths and enhanced absorbance (photoenhancement) at visible wavelengths (Sun and Smith, 2024). For AA, UV aging most likely results initially in photoenhancement. As the reaction proceeds, photobleaching occurs due to degradation of chromophores during fragmentation, resulting in a photo-recalcitrant fraction. These findings suggest that even a small precursor molecule, such as AA, might demonstrate a behavior similar to atmospheric brown carbon, exhibiting an alteration of optical properties upon UV aging. However, further investigations are needed to prove that this mechanism is responsible for the observed kinetics."

I think in the text and references "O'meara" should be "O'Meara"

This error will be corrected in a revised manuscript.

References

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