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# *Interactive comment on* "New insights into atmospherically relevant reaction systems using direct analysis in real time-mass spectrometry (DART-MS)" *by* Yue Zhao et al.

**Yue Zhao et al.**

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Reviewer # 1 Review:

The manuscript entitled, "New Insights into Atmospherically Relevant Reaction Systems using Direct Analysis in Real Time Mass Spectrometry (DART-MS)", by Zhao et al., describes a series of measurements examining the uptake of amines onto diacid aerosols and chemical composition measurements of cedrene SOA. The detection of amine reactions or composition by DART-MS enabled the authors to quantify, quite elegantly, differences between odd and even numbered diacids. The differences between these diacids are quite dramatic and the authors have done an excellent job of quantifying this and explaining the mechanism. The manuscript is well written and the



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Discussion paper

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data robust with good quantitative analysis. The authors have done an extensive job in evaluating potential artifacts in DART and interferences as reported in the main text and supplementary information. I recommend publication of the manuscript.

Response: We thank the reviewer for the positive evaluation of the manuscript.

We have also made some minor editorial changes for clarification in several places in the manuscript:

Page 7 line 145-146: The following was added “The SMPS was operated with a sheath flow of 3 LPM and an aerosol flow of 0.3 LPM.” Page 7 lines 170-171: Details of the sheath and aerosol flows were added so that it reads “Size distributions of SOA particles formed in the flow reactor at the two residence times (44 or 27 s) were also measured using SMPS (sheath and aerosol flows were 15 LPM and 1.5 LPM, respectively). Page 7 lines 171-173: For clarification, the sentence was changed to read: “Typical surface weighted geometric mean diameters (D ÌĚ_(g,S)) were measured to be 28 nm and 21 nm, and number weighted diameters were (D ÌĚ_(g,N)) of 24 and 16 nm, respectively.” Page 8 line 185: “is” was replaced with “was” so that it reads “The DART probe was placed at the entrance of the MS. . .” Page 12 lines 303-305: “data” was changed to “value” and “suggest” was changed to “suggests” so that it reads “the Fp value (Fig. 2) for the BA reaction suggests that. . .” Page 13 lines 328-330: The unit of “g cm-3” was removed from line 328 and was added to each density value so that it reads “amine-reacted diacid particles, which is assumed to be the same as the solid diacid samples (i.e., 1.619 g cm-3 for malonic acid, 1.429 g cm-3 for glutaric acid, and 1.329 g cm-3 for pimelic acid...” Figure 2 caption: “fraction” was added so that it reads “Surface area normalized fraction. . .” Figure 3 caption: “Surface area normalized fraction” replaced “Particle phase fraction” so that it reads “Surface area normalized fraction, Fp, of. . .”

We have also made some minor editorial changes for clarification in the Supporting Information: Page 2 line 41: “Fp” has been replaced with “fp” Figure S2a: Reformatted





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the y-axis. Page 6 line 78: “and” was replaced with “or” so that it reads “particle stream or standard solutions” Page 6 line 78 added after “standard solutions,” “but the ammonium adduct of the diacid was observed due to the ubiquitous presence of NH3 in room air.” Figure S4: Peak labelling was reformatted and the ammonium adduct label was added to Fig. S4a.

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