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## ***Interactive comment on “Laboratory studies of the aqueous-phase oxidation of polyols: submicron particles vs. bulk aqueous solution” by K. E. Daumit et al.***

### **Anonymous Referee #1**

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This manuscript describes aqueous-phase oxidation chemistry of polyols with a focus on production of SOA-forming material and the chemical properties. The authors find that the amount of condensed phase carbon in the smog chamber experiments is substantially less than in the corollary bulk aqueous experiments. The argument that investigations into water-mediated SOA formation need to be conducted using wet aerosol, instead of bulk solution, because formed products are substantially different is convincing. I recommend that the manuscript be published in Atmospheric Chemistry and Physics provided the comments below are addressed.

1.) Recently there has been evidence that oxidant-limited conditions influence the

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amount of SOA formed in aqueous phase experiments, both in laboratory (Nguyen et al., ACP, 2014) and modeling (Ervens et al, JGR, 2014) work. Can the authors describe their findings in this context? How is oxidant availability different in the smog chamber vs. bulk experiments? In which are they more/less limited? Could oxidant availability account for some of the differences observed in the work described here?

2.) The authors make this comment: compounds with  $1 \text{ M atm}^{-1} < H^* < 10^9 \text{ M atm}^{-1}$  will be primarily in the aqueous phase for the bulk LWC, but primarily in the gas phase at aqueous LWC. My understanding of Figure 1 is that all of the material within this range will be in the condensed phase for bulk LWC. From figure 1, it appears that range for when the fraction is  $>.5$  (material is predominantly in the condensed phase) is for  $10^{-2} \text{ M atm}^{-1}$  to  $10^9$ .

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Interactive comment on Atmos. Chem. Phys. Discuss., 14, 13649, 2014.

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