

Interactive comment on “Dithiothreitol Activity by Particulate Oxidizers of SOA Produced from Photooxidation of Hydrocarbons under Varied NO_x Levels” by Huanhuan Jiang et al.

Anonymous Referee #1

Received and published: 16 April 2017

General comments: This manuscript presents a laboratory chamber study to investigate the contribution of particulate oxidizers in secondary organic aerosols to the oxidative potential measured dithiothreitol (DTT) assays. The significance of quinones, organic hydroperoxides, and peroxyacyl nitrates (PANs) in SOA samples from various precursors and conditions was characterized, and directly compared to the measured DTT activity. The authors report that the presence of particulate organic hydroperoxides can explain most of the DTT consumption of isoprene SOA (almost 1:1 correlation), and partially for toluene SOA, while the amount of PANs and quinones appears to be negligible in the SOA systems investigated here. With completely different approaches, it is intriguing to see the results reported in this study to be closely consis-

C1

tent with Kramer et al. (Atmos Environ, 2016) who directly measured the DTT activity of synthesized isoprene-derived hydroperoxide (ISOPOOH) standard and reported a very strong DTT response (almost comparable to the quinone compound and 3 order of magnitudes higher than other major isoprene SOA constituents).

Overall, this is a well-planned study and the manuscript is well written. I have a few specific questions and suggestions are listed below for the authors' clarification and consideration. I am in support of publication once these questions have been addressed.

Specific comments: Page 5, Line 24: should the storing condition here be 4 °C instead of -4 °C? Page 6 Line 2: how the reaction between DTT and SOA could be quenched by adding 1 mL trichloroacetic acid (1 % w/v)? Was this to quench specific components in SOA samples before measuring the remaining DTT with DTNB? More detailed explanation is needed as it is not clear here. Page 6 Line 13-17: how the slopes shown in Figure S1 compare to each other statistically? Table 1. It looks like no seed aerosols were introduced into the chamber experiments. Did the SOA form solely because of nucleation? How the chemical composition and DTT activity might change if there are pre-existing seed aerosols? Figure 4: why a higher concentration of potassium phosphate buffer was needed for the Toluene LNOX-17 Nov 2016 sample? Would changing buffer concentrations affect the measured DTT activity?

Interactive comment on Atmos. Chem. Phys. Discuss., doi:10.5194/acp-2017-214, 2017.

C2